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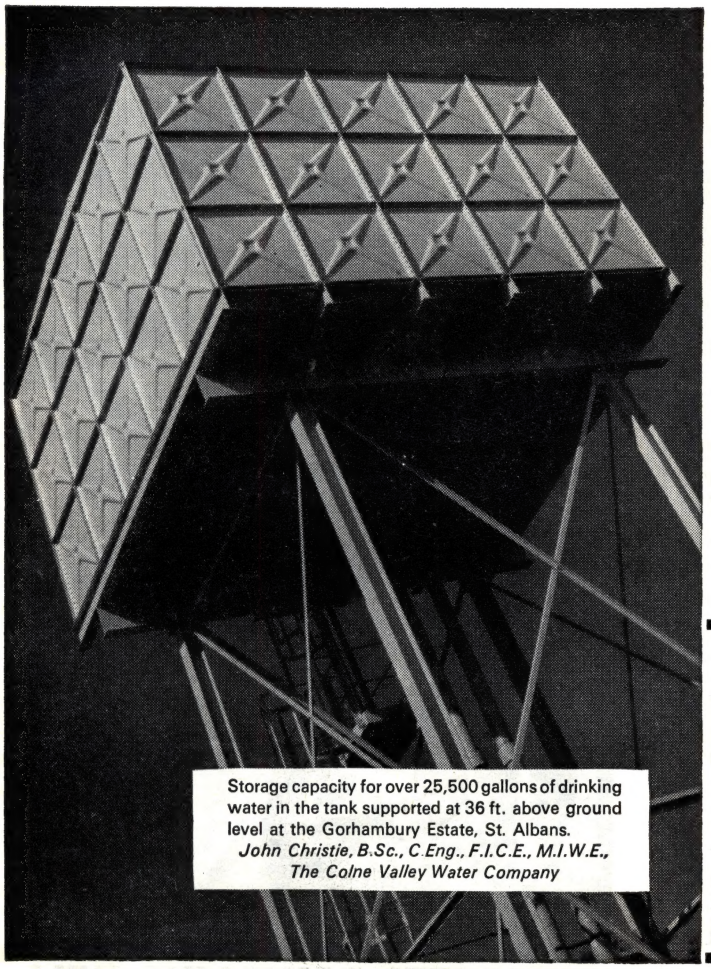

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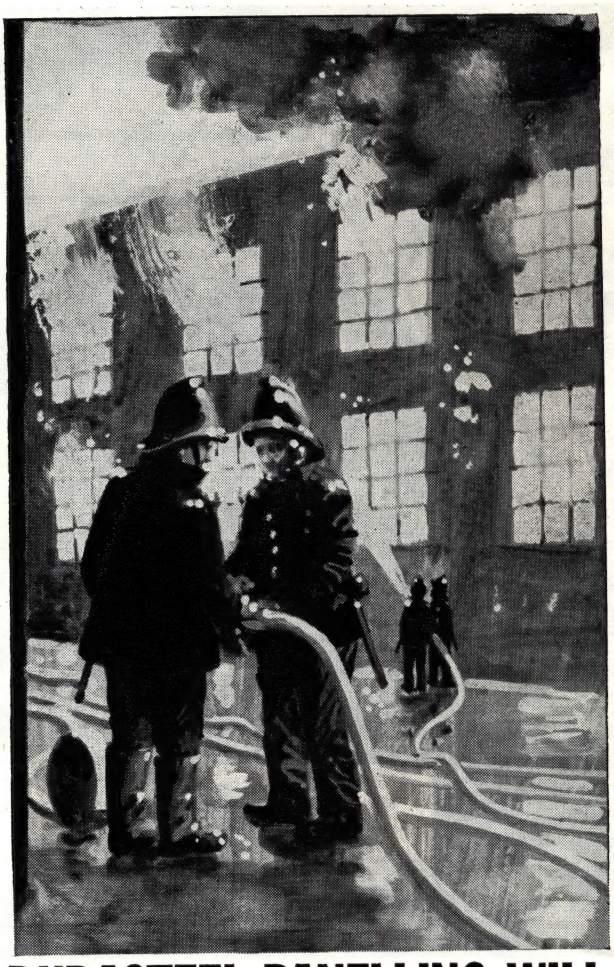

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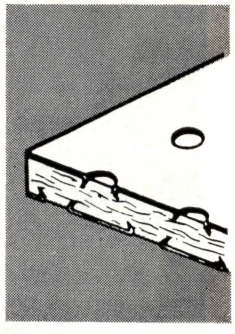

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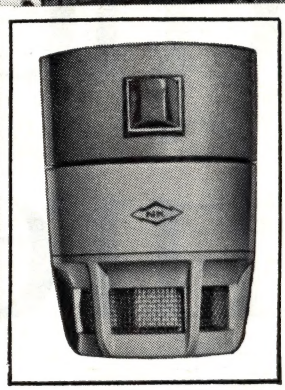

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Are we getting through?

IT is customary as one year finishes and the new year starts to look back over the past twelve months and assess what progress has been made, what major events have taken place and what conclusions one can draw from those happenings—and what resolutions one can make. The fire protection services are essentially forward-looking and, while we must to some extent be concerned with the past, inquests can be useful only if they provide guide-lines for future actions.

We therefore propose not to dwell too much on the events of 1970—in itself a very important year for our Service—but to look ahead and to see how the past affects the future. Without a doubt the two most important matters which are going to occupy our minds and actions for a long time to come are the Holroyd Report and the Fire Precautions Bill 1970.

The Report and the Bill are firmly interdependent and that is one reason why our fears that Holroyd might be shelved indefinitely like so many other reports have been lessened. We have said before that the Fire Precautions Bill may have many shortcomings, but that it is certainly a large step in the right direction. Both the Holroyd Report and the Bill will depend on the interest and sense of urgency of our legislators to achieve their maximum potential of usefulness.

SENSE OF URGENCY

The first signs that we can expect some sense of urgency and understanding of our problems were given in the debate during the second reading of the Bill when members of all parties showed a commendable awareness of the vital importance of the matter.

Time and time again in the past we have complained bitterly in the pages of this Journal about the lack of any sense of urgency concerned with fire prevention and indeed fire protection at national and local government level. Only when some great catastrophe had happened, only when corpses were piled high behind some barred emergency exit, only then was action taken.

And even then, the efforts made were often feeble or not far reaching enough or placed the responsibility for carrying out new legislation into the wrong hands.

Equally, there has never been, with the possible exception of the last war, a proper understanding or appreciation of the value of our fire protection services, resulting in a low status rating for these dedicated men and women as well as an inclination to save money and cut budgets on a service which saves the national economy hundreds of millions of pounds each year; fire service working conditions contribute nothing in this modern technological age to encouraging the right kind of person to join, or to keep those already in the Service happy and content.

It therefore augurs well for the future that several MPs took a constructive part in the discussion during the Bill's second reading and that the Commons showed a new awareness of our problems. In this issue we are glad to report such comments as "The Bill is only part of what has to be done in a direction in which there is not nearly enough interest except when a tragic event occurs" and "How foolish we are not to provide some financial incentive to ensure that there are sprinklers, either chemical or a curtain of water, in comparatively modern buildings."

Finally from Mr. Merlyn Rees: "We do not provide the command structure, either at the Home Office or in the wider fire service, we do not provide the status for firemen or fire officers and we do not provide sufficient money for them to do their work properly."

We feel that these last words spoken by the former Parliamentary Under-Secretary of State at the Home Office sum up what we have complained about in the past, but we enter 1971 confident that through Holroyd and the Bill and the new awareness of the importance of the whole field of fire protection, our masters, despite all the other pressing claims on their attention, will no longer neglect this matter of vital national importance—a matter which, with such disastrous results, has been neglected far too long.

Harry Klopper

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COVER PICTURE: Fire rages through a department store in Brighton. Full report on Page 399.

Picture, courtesy *Brighton Evening Argus*

CFOA conference brochure

THE Chief Fire Officers' Association announce that Unisaf Publications Ltd.—publishers of FIRE and FIRE INTERNATIONAL—have been appointed official agents to produce the Association's conference brochure.

All communications regarding advertisements in the brochure should be addressed to: G. W. Spurgeon, Advertisement Director, Unisaf Publications Ltd., Unisaf House, Dudley Road, Tunbridge Wells, Kent; telephone—Tunbridge Wells 23184.

Laser beam fire detectors being made by Pyrene

LASER beam fire detectors are now being manufactured commercially by The Pyrene Co. Ltd. and are expected to be marketed during the middle of this year.

Field trials are already under way with five experimental units installed by the South Western Electricity Board and the Atomic Energy Authority. Manufacture is under licence from the National Research and Development Council.

Laser beam fire detection, pioneered at the Fire Research Station, is responsive to all kinds of fire and is expected to provide more economical protection of premises.

Mr. D. I. Lawson, Director of the Fire Research Station, gave a paper on laser beam detection at the recent joint conference of the IFPA and BFSA in London. The entire paper, complete with illustrations, is given on pages 377-379 of this issue of FIRE.

No significant change in fire-death trend

CARELESS disposal of cigarettes, matches and other smoking materials is the most frequent cause of fatal fires in the UK, according to statistics compiled by the Fire Research Station and published in Fire Research Technical Paper No 26, *Deaths in Fires Attended by Fire Brigades in 1969.*

Faulty oil and electric space-heating installations and fires in grates are the second most frequent cause of such fatalities. The most dangerous periods of the day for fatal fires are from midnight to 3 am and 6 am to mid-day.

There were 861 deaths in fires in the UK during 1969, including 10 firemen killed on duty; 231 of the deaths occurred in 86 multiple-death fires, the most serious of these being the Saffron Walden Hotel fire in which 11 people died. Although the total fatalities for 1969 are four less than for 1968, there has been no significant over-all change in the upward trend since 1960.

By far the largest proportion of deaths occurred in buildings, and 90 per cent of these were in dwellings, especially old ones. The statistics show that more deaths occurred in terraced houses and in buildings converted into flats than in other dwellings, and over half of the multiple-death fires occurred in such occupancies.

Death in 40 per cent of fatal fires was caused by burns, and in 54 per cent of cases by asphyxiation. The deaths from asphyxiation included those of victims who were well away from the seat of the fire at ignition and who were overcome by toxic fumes.

Most vulnerable

The very young and the old are the most vulnerable to fire, and constitute 57 per cent of all fatal cases. This can be attributed largely to their being left on their own, and it is likely that two-thirds of this class of victim were in fact alone at the start of the fire.

Deaths in Fires Attended by Fire Brigades in 1969 is prepared by the Department of Trade and Industry and Fire Offices Committee joint Fire Research Organisation, and is available from FIRE Book Department, Unisaf House, Tunbridge Wells, Kent, price 5s 9d, including postage and packing, or from HMSO.

CHAMPION SWIMMERS

Mr. Gordon Renton, Home Office Fire Department, presents the Staffordshire Cup for the over-all swimming champions of the Fire Service Sports and Athletics Association to Leading Fireman J. Robertson, captain of the winning team from Newcastle and Gateshead Fire Brigade, at the swimming gala at Coseley Baths organised by Staffordshire Fire Brigade.

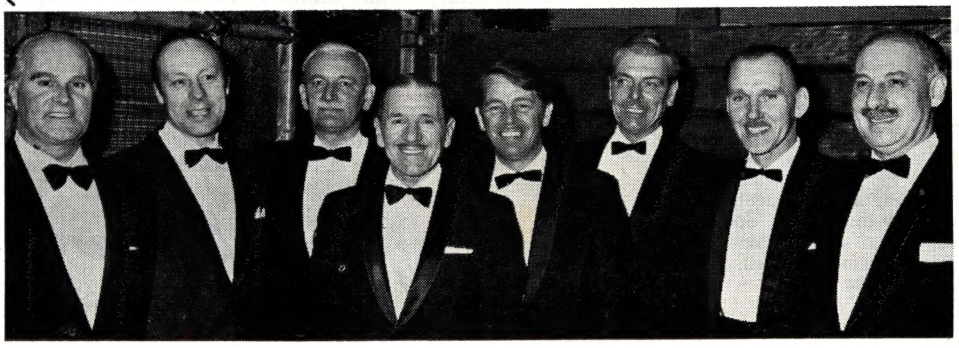
BEM awards for gallantry at Dudgeons Wharf

TWO London fire-fighters have been awarded the BEM for gallantry for their attempted rescue of one of their colleagues at the Dudgeons Wharf disaster in July, 1969, when five firemen and a demolition worker were killed in an explosion.

They are Station Officer Harold Snelling, aged 39, of the Poplar unit and Fireman Ian Richards, aged 27, of the East Ham unit.

The explosion threw both men into a pool of oil and water, but although they were suffering from shock and were covered in oil which was affecting their eyes they climbed into the tank to rescue their colleague, only to find that he was apparently dead.

IMPRESSIVE GATHERING AT WEST RIDING'S ANNUAL BALL



At the annual ball of the West Riding Fire Brigade were HMI C. D. Bidgood and 7 CFOs—Mr. N. Dempsey (Dewsbury), Mr. D. Baker (Huddersfield), Mr. W. Barlow (Doncaster), Mr. J. E. Slack (Wakefield), Mr. S. Lambert (Sheffield), Mr. C. Forrest (Leeds) and Mr. K. L. Holland (West Riding).

MP's air their views on the Fire Precautions Bill

QUOTES FROM THE HOUSE

THE Fire Precautions Bill, 1970, was given its second reading in the House of Commons on November 20. It is now being considered by a committee of the House and, subject to further Parliamentary approval, may become law by about Easter this year.

Thirteen MPs used in the region of 30,000 words in their 3½-hour discussion of the Bill, which was introduced by the Minister of State at the Home Office, Mr. Richard Sharples, with the reply by Mr. Edward Taylor, Under-Secretary of State for Health and Education, Scottish Office.

The principal Opposition speakers were Mr. Merlyn Rees and Mr. Gregor Mackenzie, but speakers from both sides emphasised that the issue was not one for party politics.

Among the points made by the speakers were these:

Mr. Sharples: "The Bill is more than simply a consolidating measure. Its purpose is to enable us to deal promptly and effectively with new fire hazards as they arise in the wide sphere of social activity covered by the Bill."

"The main responsibility for enforcing the provisions of the Bill is placed on fire authorities by Clause 18. It is our hope that the fire authorities will use the fire brigades for this purpose."

Mr. Rees: "The Bill is only part of what has to be done in a direction in which there is not nearly enough interest except when a tragic event occurs. I sometimes feel that if we used the title 'Gurkha Fire Brigade' there would be more interest in the House and more letters to *The Times* about the matter."

"Was the decision to publish the Bill taken eventually in the light of the Holroyd Report? I hope that all the detailed work that went into the Report was not lost when the final draft of the Bill was drawn up.

"My over-all view is that more than legislation is required in fire prevention and fire precautions. Legislation is important but it is not enough.

"The Bill must be seen in the context of the Holroyd Report. By itself, the Bill would be a waste of time. In the 1960s, there has been a move away, in the fire service, from a fire-fighting-only service. This has been the theme of people interested in fire precautions and prevention for the last 20 years.

"We must build on developments so far in the fire service. An excellent feature that I found when I went to the Home Office was that technical college at Moreton-in-Marsh, which is absolutely first rate. In this respect we lead the world."

"Local authorities must learn to use the fire service. In too many cases it is the poor relation. But we shall not prevent fires without more trained staff."

"A lot of lip service is paid to fire precautions but when it comes to the crunch of a fire, doors are found to be locked and boxes are stored behind them."

"If a fire certificate is not issued by the fire brigade, how will a brigade know its way around when it has to go to the factory to deal with a fire, apart from whether it has enough staff to have previously visited the place?"

"We commend the Bill, but we ask the Home Secretary to let us implement it at the same time as implementing Holroyd. Then we really shall have moved in a different direction in a service which needs the commendation and admiration of everyone in the country."

Tribute to Mr. H. M. Smith

DURING the course of the second reading of the Bill, Mr. Merlyn Rees, MP for Leeds and a former Parliamentary Under-Secretary of State at the Home Office, paid tribute to the Home Office Fire Inspectorate and to the Fire Service as a whole.

He said: "One of my responsibilities, under the Home Secretary, was the fire service. I admired it greatly, both the civil servants and the professions.

"This is a time to say something about the Chief Fire Inspector, who has served the fire service for a very long time. I and everyone have a great admiration for him, which needs to be put on the record, and the fire service owes him much.

"But we do not provide the command structure, either at the Home Office or in the wider fire service, we do not provide the status for firemen or fire officers and we do not provide sufficient money for them to do their work properly."

Mr. John Tilney: "Certain high-rise flats are included in the Bill. Unfortunately, there are other flats—particularly in private houses—which, for one reason or another, are excluded. I do not quite understand why, in the long term, those private houses which are owned by corporations—in Liverpool, a large fraction of our total residential houses is owned by the Corporation, and this applies also to many other cities—should not come under some form of compulsory fire escape regulations.

"How foolish we are not to provide some financial incentive to ensure that there are sprinklers, either chemical or a curtain of water, in comparatively modern buildings."

"It is not just old buildings or those which were constructed before the war that go up in flames."

"In this so-called technological age it is absurd that further incentives are not given to the builders and owners of these buildings to protect their property."

Mr. Michael English: "Removed from its turgid wording, it appears to me that all the existing provisions of local Acts stay in force unless they require something that contravenes the Bill when enacted. In other words, what individuals, companies and organisations throughout the country must do is, not deal with a uniform code, as the Minister of State suggested, but deal with a uniform code plus local variations and then decide whether the local variations contravene the Bill when enacted."

"Another fault in the Bill is its extreme concentration upon things as distinct, strangely enough, from people."

Mr. Norman Fowler: "The Bill concerns the mass fire risk hazards. This is only the tip of the problem, because most of the increase in deaths in recent years have occurred in private houses. In this connection it is good to see a provision in Clause 3 about flats. But it seems to me that when talking about flats there is a very great temptation to think in terms of the purpose-built block. A great number of the flats, particularly in London, but also in other major cities, are conversions of what used to be single houses, and in many of these cases there is a real fire hazard which is not sufficiently recognised."

Mr. Hugh Jenkins: "Some churches have attached to them church halls which are frequently used for dances and other entertainments, and it is not clear whether these would be required to have a certificate. We shall want to know about that. It appears that such church buildings which come under the existing licensing control of some authorities would not be required to have a certificate under this Bill, and we may well find that a modification is required in this respect."

Mr. Roger Moate: "Holroyd concerned itself considerably with fire prevention and not exclusively with the structure of fire brigades. It also gave less attention to the prevention of fatalities in the home than it might have done.

"This Bill does not touch on the subject at all and I suggest that consideration be given to expanding it—because with the best will in the world it is unlikely that we will get another in the foreseeable future—to place an obligation on fire authorities, with the necessary finance, of course, to carry publicity into private homes. In that way the publicity advocated by Holroyd could be implemented."

"£400 is not much of a fine if, as a result of a breach of the regulations, serious bodily injury or a fatality occurs. On the other hand, it is grossly excessive if the legislation is

CONTINUED ON PAGE 371

The AMC gives its view on the Holroyd Report

THE Association of Municipal Corporations has now published its observations on the parts of the Holroyd Committee dealing with the role of the Home Office Fire Department, the future of the Fire Service Staff College and recruit and continuation training.

After referring to its evidence to the Committee, in which it stated that the existing relationship between the central government and fire authorities worked reasonably well, the Association's statement continues:

"The Association believes that it would be quite wrong to transfer from fire authorities to the Home Secretary the duty of ensuring efficiency in fire-fighting unless it could be shown in the clearest terms that section one of the Fire Services Act 1947 has failed in its aim of requiring efficient brigades.

Hard to understand

"In chapter V of their report the Committee do not urge any change in the existing statutory provisions from which fire authorities derive their responsibilities. It is therefore all the harder to understand why the Home Secretary should be thought to need an additional, omnibus, statutory duty, which would lead to a duality of responsibility, involving a wasteful use of manpower."

The Committee's report, goes on the statement, contains an expectation "of a change in the structure of local government but no allowance is made for change in the character of the local authorities' representative bodies. It is quite practicable to envisage local government collectively performing some at least of the functions which the Committee would assign to the Fire Department of the Home Office.

"The Association considers that the Committee have not made out a strong enough case for enlarging the Fire Department, but believes that the better way of proceeding would be for discussions to be held to determine what is the true priority for carrying out the activities referred to and what may be the most appropriate method."

Dealing with the Committee's proposed "phasing out" of the Staff College at Dorking the statement says: "On cost grounds alone it is necessary to eliminate the possibility of establishing a 'purpose-built' Staff College unit at Moreton-in-Marsh.

"The figures which the Home Office have made available indicate that in financial terms there could be an appreciable saving for the Staff College to be merged with the Technical College but straightforward comparisons are not easy to make and some reservations must be entered at this stage as to the actual size of the difference claimed.

"There is in any event much more involved than comparisons of cost. The Committee's arguments against the continued existence of the Staff College may be summarised thus: (i) it would be beneficial for senior officers to have more management training; and (ii) courses at Dorking would benefit from direct access to practical fireground and other facilities of a sophisticated nature—such as exist at the Technical College.

"On the first point it may be said that if, as the Committee suggest, it would be uneconomic to increase the staff at Dorking, there is more than one way of providing any necessary tuition. The second point seems very much to be arguing for a transfer to Moreton-in-Marsh so that better use could be made of the facilities already there rather than considering the Staff College concept on its own merits.

"It is not difficult to envisage a developing use of Moreton-in-Marsh appropriate to its existing functions; for example, industrial brigades could benefit from the attendance of their members, nor is it by any means certain that a greater emphasis on emergency planning will not become the case, warranting training at the Technical College.

"With a uniformed, disciplined service, it is difficult to understand why the Committee are against Dorking, for the reasons they have themselves given do little more than indicate a desire to see greater use made of the Technical College's facilities. Nomenclature can be misleading, but it is undeniable that there is need for training actual and potential senior fire service officers in subjects which hardly fall under the rubric of 'technical'; command training is a singularly apt description.

"The Association believes that such training is best conducted quite separately from that which is broadly termed technical. It may not be unfair to use the method of reasoning adopted by the Committee and state that a staff college requires facilities for the development of management potential which are not needed by a technical college.

"The vital question to ask is whether there are positive advantages for those undergoing command training in being physically separated from those receiving technical training. The answer appears to be quite definitely that there are, as it is useless to pretend that the atmosphere in which a person works and studies is not of considerable influence on the results of his labours.

Dorking's attributes

"It must be stated in all fairness that it is not being argued that all the attributes of Dorking are necessary for the purpose. Nevertheless, Moreton-in-Marsh would not even provide the minimum level and the fact that Dorking is so well endowed does not detract from its suitability.

"It would be naive to pretend that status—difference in rank—is unimportant in, and for, the fire service. A disciplined service requires that due weight is given to the holding of higher rank; without it there could be little hope for any great degree of efficiency in a crisis.

"The Association is, therefore, firmly of the opinion that a Staff College is needed by the fire service and not just "staff college" facilities as part of a multi-purpose establishment. Considerations of cost appear to rule out the possibility of creating a Staff College in physical proximity to the Technical College so that the only proper course is to continue the present arrangement.

"That certain works are necessary—indeed overdue—at Dorking is undeniable but, even allowing for these, and the Association believes that they should be put in hand at once, the possible savings from a move to Moreton-in-Marsh appear in no way to outweigh the advantages of the Staff College continuing at Dorking."

Arguments still valid

Referring to the Committee's recommendations on recruit and continuation training, the Association reaffirms its earlier view that, as proposed in the Banwell/Abel Report, a combination of recruit and continuation training was practicable at area training schools—rather than at the one or two central establishments proposed by the Committee.

This view was put to the Holroyd Committee, as additional evidence, by the AMC, the CCA and the GLC in December, 1968. "The arguments put forward then are no less valid today", continues the statement.

"The Association considers that the conclusion that a central establishment would be of the order of 21 per cent—23 per cent cheaper assesses the difference as too high a figure, and that if continuation training were to be carried out to a much greater degree than at present and be held at area training schools the unit cost would be reduced to such an extent that the relative financial advantage of a central school would be appreciably reduced still further.

"In the end, however, there are considerations other than what could well be marginal differences in cost to be allowed for: the advantages of local control of an important part of a local service, the ability to use existing authorities for the management of area schools and for the provision of the financial, architectural and other services they would need, and, by no means least importantly, the factor which has already been stressed of carrying out recruit training as near as possible to the recruit's home."

PROTEST AT GRANT CUT

THE four local authority associations have protested at the double cut in grant following publication of the government's Rate Support Grant Order.

The associations say they had already made plans to economise. But they are "extremely concerned" at the proposal for further reduction to the expenditure forecasts, by £10 million in 1971-72 and £25 million in 1972-73, to represent savings by increased efficiency.

"Despite cuts and economies already achieved", reads the statement, "it will be difficult for local authorities to bear the double cut in grant without a significant rise in rates or cuts in the planned development of service."

QUOTES FROM THE HOUSE

CONTINUED FROM PAGE 369

applied where a hotel infringes the regulations by altering the internal arrangements of its furniture."

Mr. Ronald Brown: "It is regrettable that the Government have persistently refused to take action on various furnishing materials, such as polyurethane and foam rubber, which are proven beyond doubt to constitute a grave hazard."

Mr. David Stoddart: "I make a plea for good lighting of emergency exits. It is all very well to provide escape doors and to keep them clear, but it is of little use to somebody with failing eyesight if the access or egress emergency exit is badly lighted.

"On the question of consultation between local authorities and fire authorities, there have been occasions when I, as a member of a local authority, have been involved in this kind of thing—when the local authority, perhaps as the planning authority, or as the education authority, has an interest in the financial implications of providing fire precautions. I do not say that this will occur very often, but I know of an instance in which it was only by a great deal of political and personal arm-twisting by my colleagues and myself that a local authority was prevented from ignoring the advice of the chief fire officer and relaxing the regulations for a building."

Mr. J. R. Kinsey: "The fire stations are a mass of gleaming metal. Possibly that is a very good thing. But I wonder whether a day's inspection of houses would be better than a day's polishing. There would have to be consultations to see whether that was possible."

Mr. Mackenzie: "Although the Holroyd Report is not the sole basis of the Bill, it has played a large part in the Measure's preparation. A number of professional organisations, fire officers, the Fire Brigades Union and local authorities, have been of great help in the evidence they have given."

"This is the sort of Bill on which we must work together to produce something that is worthy of us all."

"If there has been a recurring theme it has been the many questions raised about houses in multi-occupation. There are difficulties here.

"We can summarise our concern by saying that these houses are invariably very old and they were certainly never designed for their present purpose. Often in their reconstruction and renovation little thought was given to fire prevention. Often materials used have not been suitable for fire prevention purposes."

"All the people who are concerned with fire look forward to the time when Holroyd will be discussed in the House in much greater detail. The Bill is part of the answer. We look forward to the time when the Government can look at the whole question of the fire services in Scotland, England and Wales."

Mr. Taylor: "There are a number of local Acts dealing with means of escape and fire precautions which in their application to premises with which the Bill is concerned may conflict with the requirements imposed under the Bill and regulations made under Clause 12. This is a sweeping-up provision to deal with any such conflict between a local Act and this Bill and any regulations made under Clause 12."

"What of our estimates of additional manpower? Some members have suggested that 400 will not be enough, while others said that it will be an over-estimate in relation to what can be done with the available resources. We have tried to make the best possible calculation because we know what the strength of fire prevention staffs is and, from the returns, we know what the inspectors find on their visits made under the current regulations, including good will visits.

"The Holroyd Report went a great deal further in its concept and recommendations than we are considering now. The inquiry related to the principles and organisation of the fire services, the relationship between central government and local fire authorities, the functions of the fire services and other matters. We have not been able to deal with those recommendations which might have involved legislation. The Bill was in an advanced state of preparation when the Holroyd Report was published.

"We need consultations with a variety of organisations and there was no time for a full discussion and agreement on all the proposals in the Holroyd Report. Where it is possible, due regard has been paid to the recommendations of the inquiry."

'Regrets' from the university

THE Registrar of Essex University, near Colchester, has written to CFO R. S. Barnes, Essex Fire Brigade, expressing "the University's most sincere regrets" for the incident in which members of the brigade were "molested" at the University on November 24.

The brigade was called to two bonfires lit by students to demonstrate grievances, reports CFO Barnes. "A charged line of hose was run out to provide cover", his report continues. "It was not intended to use the jet. Students took exception to the firemen's action, a scuffle developed and a length of hose was cut.

"The national press inflated the incident. Nevertheless, it is a matter for concern that firemen, who have no interest in the students' grievances, should be subjected to such interference in their duties.

"I consider the personnel of the brigade behaved with commendable restraint."

● The Fire Research Station, after a short spell under the aegis of the Department of Trade and Industry (it was previously with the Ministry of Technology), became part of the Department of the Environment with effect from January 1, 1971. The object and functions of the Station remain unchanged, as do the interest of the insurance companies in its running and financing.

PROMOTED and RETIRED

THE new DCFO of Lincoln Fire Brigade is Mr. **P. C. Rout** who has moved to the city after serving as a DO with Staffordshire Fire Brigade.

* * *

In the London Fire Brigade ADO **S. Vince** has been promoted to DO and appointed Senior FPO for "J" Division. He will be based at Edmonton.

* * *

Two ADOs in East Sussex Fire Brigade have been promoted to DO III and appointed Deputy Commanders of Divisions with special responsibility for fire prevention.

DO **J. F. Foster,** AMIFireE, who moves to "B" Division, joined the brigade in June after three years on the staff at the Dorking Fire Service College; he previously served with the Hertfordshire and Middlesex brigades.

DO **G. Horsfield,** AMIFireE, joined East Sussex as deputy senior FPO in 1969 having previously served with the Staffordshire, West Riding and Sheffield brigades.

* * *

DO III **K. H. Patenall** has moved from Cornwall Fire Brigade to take up an appointment as Acting Deputy DO in the northern division of Staffordshire Fire Brigade. He joined the service in Northamptonshire in 1961 and also served in Oxfordshire before moving to Staffordshire as Station Officer in 1967.

Also in the Cornwall HQ FP department, Station Officer **P. Willett** has been promoted to ADO and Sub Officer **C. D. Anstis** has been promoted to Station Officer.

* * *

In Nottingham Sub Officer **C. K. Worley** has been promoted to Station Officer, Leading Fireman **M. McGee** to Sub Officer, and Fireman **C. J. Gaulton** to Leading Fireman.

TWO retirements from London Fire Brigade are ADO **E. Horner** and Station Officer **C. Cowland,** who both have more than 31 years' service.

Mr. Horner joined the Croydon brigade in 1939 and, after serving in the armed forces during the last war, rose to senior staff officer before the formation of the enlarged London Fire Brigade.

Mr. Cowland joined the AFS in 1938 and on the outbreak of war became a whole-time fireman at Finchley. After service in the army he joined the former Middlesex Fire Brigade and was promoted to Station Officer in 1962.

* * *

There are two senior retirements also from the Cornwall Fire Brigade: DO III **L. J. Stanbury,** senior FPO for "A" Division since 1948, and ADO **H. A. Madams,** BEM, who is retiring on health grounds.

LETTERS TO THE EDITOR

An analysis of the subject

The right road to status lies with the officers

I READ with interest your observations on "The right way to status" (November FIRE) but suggest that your proposals are not only the wrong way, but also start at the wrong end of the road.

The status of the Fire Service depends on far more than giving opportunity or encouragement to firemen to learn their job, this is fairly well catered for already, but even with the present opportunity for education and study within the service the quality of recruit will not be lifted if the over-all status of the service fails to attract the right type of man in the first place.

In my opinion the status of the service is measured first by the status of its officers, the status of the Chief Officer being the first criterion and then down the line to senior officers, junior officers and ultimately firemen, and it is at officer level that we should first look for improvement.

However, apart from deciding at which end of the scale status should commence we must also look at the contributory factors which govern it, and here, I suggest, a far deeper analysis of the subject is necessary.

To a large extent the status of a service such as ours depends upon a proper appreciation and recognition, by the powers that be, of the value of the service to the public, the responsibilities inherent in its functions and the degree of expertise necessary to discharge those responsibilities.

In addition, provided those who are in the service are in fact concerned with its status, pressure must be exerted on those outside, who have influence on the question, from those within, particularly the officers, through their behaviour and dignity in demanding full recognition of their standing and rights in respect of pay and conditions.

There is little doubt that, of later years, an improvement of the status of the service has been gained by the first recognition of central government in acknowledging the service's qualifications to deal with statutory requirements for means of escape, followed by further recognition by the advent of the Offices, Shops and Railway Premises Act, and now, from the proposals contained in the current Fire Precautions Bill, it becomes apparent that the service is to be recognised as the major instrument to deal with FP legislation.

These are factors which must inevitably raise the status of the service, but, even so, it still remains for the service to show that it fully justifies the confidence placed in it by the way it accepts these additional and very heavy responsibilities and the methods it adopts to deal with them.

I regret having to admit that for so long many of us have accepted the label of "The Cinderella Service" and, to a large extent, this is due to a tendency to let ourselves be led from the rear. But the remedy lies in our own hands.

This service, by the very nature of its purpose, is vitally important to the community in general, but it cannot function without a special type of dedicated officers and men, imbued with pride in their job, and endowed with moral courage necessary to proclaim their abilities. Each and every member knows the demands of the job he has undertaken and the personal sacrifices he is called upon to make in the execution of his duty, but for us to know this is not enough, we must also make sure that everyone knows it and then perhaps we shall get on the right road to status.—**N. G. Perry**, President, National Association of Fire Officers.

Dalmatians as 'fire dogs'

RECENTLY, after a bad thunderstorm, firemen visited a house in our road and also called at our house. Such interest was shown by them in our Dalmatian dogs that I showed them this photograph.

I was most surprised to learn from them that they had no idea that Dalmatians have a long history as "fire dogs" in the United States.

In my search for information of the activities of Dalmatians I have received many accounts of their exploits and loyalties with various fire departments. With the passing of horse-drawn fire engines, most of the fire dogs went, too,

but one or two of the 385 engines in New York still have a Dalmatian as mascot.

My photograph shows the Dalmatian "Chief" who rode in a specially constructed "side-car" with Engine Company 20 in the 1920s. Like all his fellows, he will have been trained to stay with the engine at a fire location. —**Mrs. T. McWilliam**, 44a Moorend, Spondon, Derby.

AUTONOMOUS BRIGADES FOR MAJOR HAZARDS

THE Institution of Professional Civil Servants point out (September FIRE) that aircraft fire-fighting is a specialised job, differing from dealing with fires in buildings, and they question the wisdom of integrating airport and local authority fire brigades as recommended by the Holroyd Committee.

The hazards presented by, and the techniques for dealing with, a fire in a crashed aircraft with its attendant rescue problems are manifestly different from those of, for example, a modern supertanker carrying thousands of tons of crude oil. If we consider a large county fire brigade containing within its boundaries a major airport and a large refinery, it is clearly unfair to expect any brigade to fully master the techniques of both. The stations providing the attendances to these specialised risks should be separated from the county brigade and become airport and refinery area brigades respectively, with their own chief offices and administration.

If our county brigade area also includes a refrigerated LNG plant, and a thousand-bed hospital with quantities of radioactive isotopes, then the stations serving these special risk areas should also be divorced from the county and become autonomous brigades, again with their own brigade orders, chain of communications, and so on.

Fighting a serious fire in a large chemical works calls for a different approach again, so if one of our station grounds includes such a chemical factory, that station too should become a separate brigade in its own right.

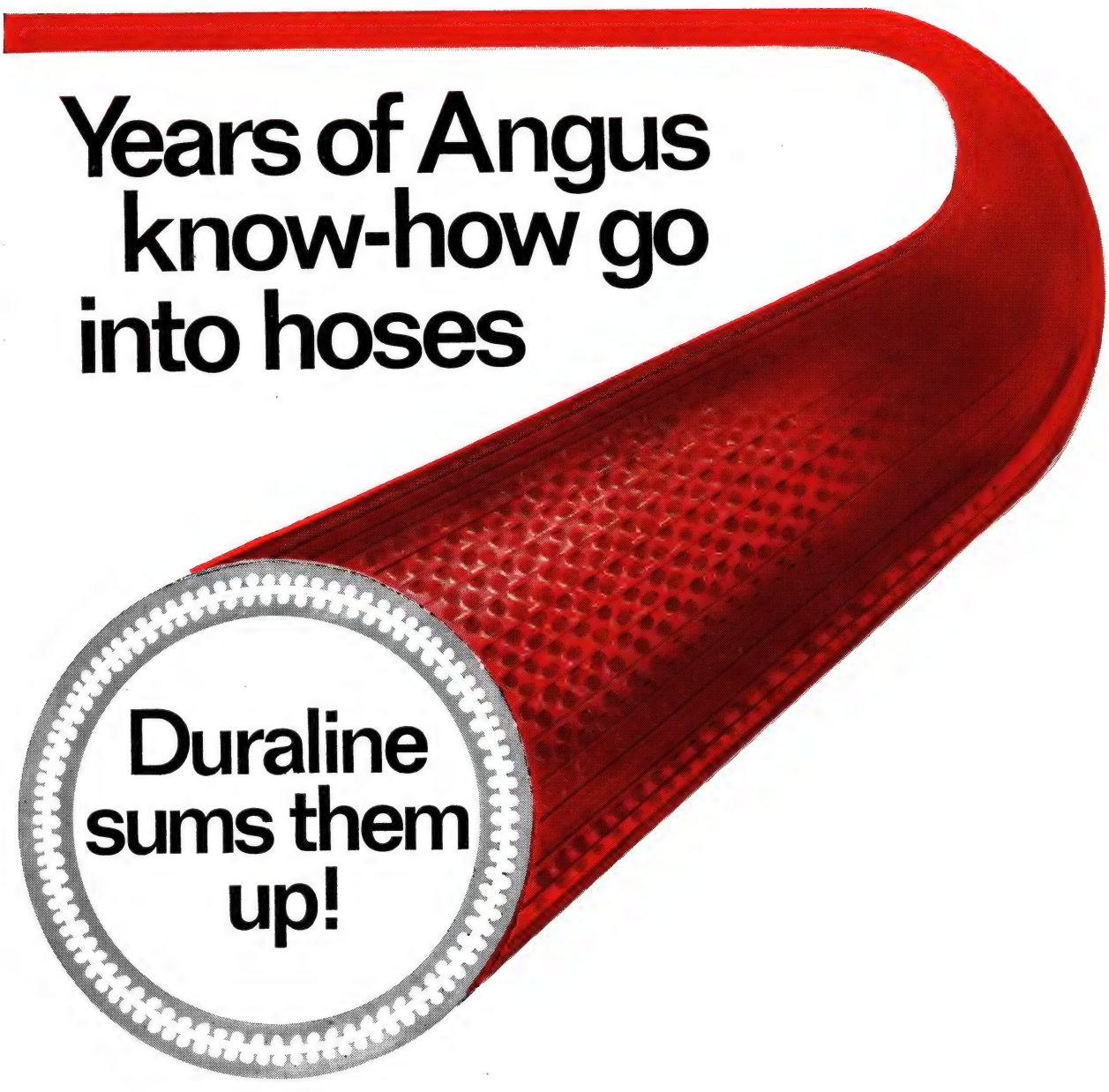
Riverdale Committee

Several miles away, in the quiet rural areas of sparse habitation, our county brigade also includes at present some retained stations whose annual "crop" of fires is restricted to standing corn, dutch barns and combine harvesters—quite unlike any of the other hazards so far mentioned, and so adequately justifying the contention that these stations should become individual fire brigades with their own uniforms, discipline code and the rest.

These proposals for modernising the service, to enable it to better cope with the increasing hazards of the present day and in the future, may seem rather far-fetched, but in fact such thinking is not entirely new. Such a system has actually been tried; for instance, these were the conditions found by the Riverdale Committee in 1935.—**John E. Mills, GIFireE**, Hockley, Essex.

READERS' LETTERS are continued on page 397

Years of Angus know-how go into hoses



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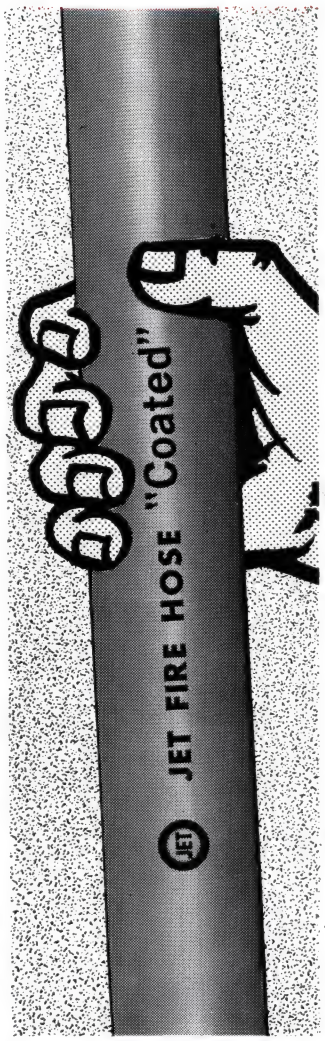

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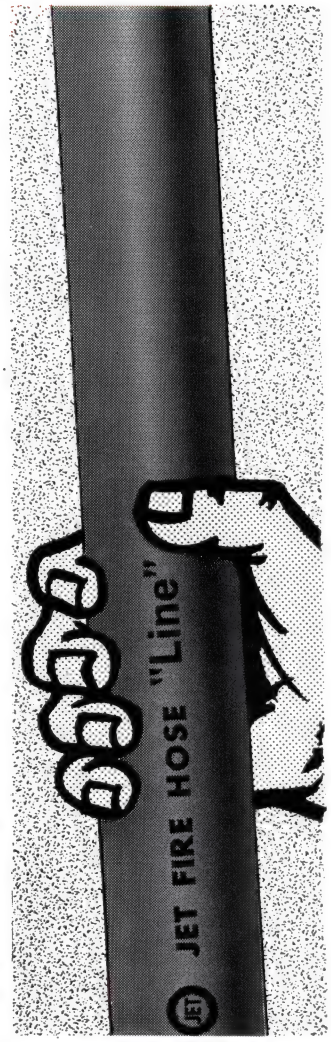

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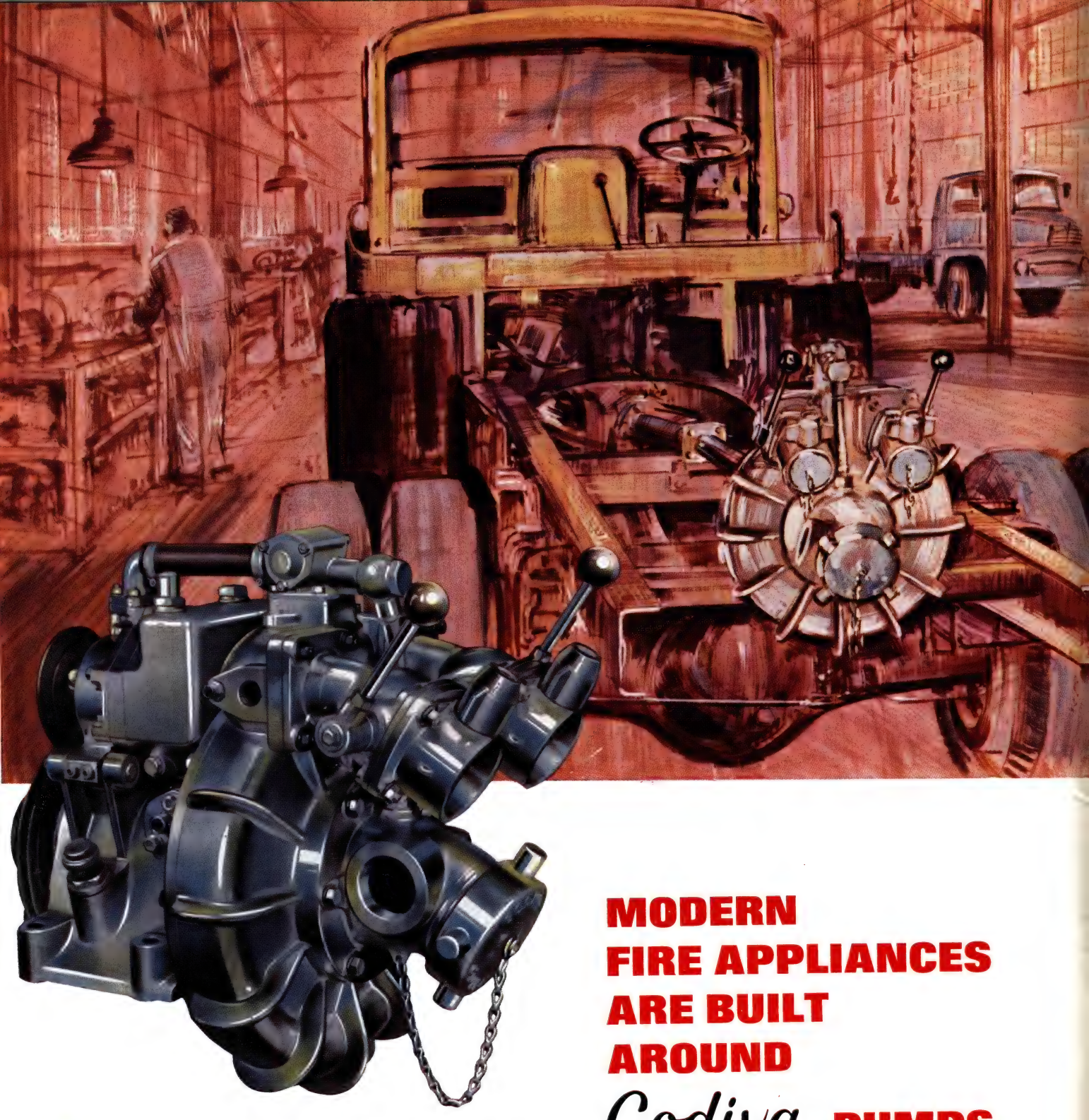

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The paper given by Mr. D. I. LAWSON, MSc, CEng, FIEE, FInstP, FRSA, MIFireE, Director of the Fire Research Station, to the recent combined conference in London of the IFPA and the BFSA

LASER FIRE DETECTION SYSTEM

SINCE the early part of the present decade the Fire Research Station has been stressing the importance of early detection.[1] This was underlined by a study of over 1,200 large fires in 1966.[2]

Recent estimates[3] have shown that rapid detection could give a potential saving of about £20m per annum. During the year the Departmental Committee of Enquiry further emphasised the need for rapid detection in its report.[4]

It is against this background that, some years ago, I started research into a new kind of fire detection system.

The velocity of light in a vacuum is one of the fundamental constants of nature and is equal to nearly 300 million metres per second, or in British units 186,000 miles per second (Fig 1). The velocity of light in other gases is slightly less than this.

For example, in air the velocity is about 3 parts in 10,000 less than this figure, while for carbon dioxide the difference in velocity would be about 4½ parts in 10,000 less, so that you can see that the velocity of light in gases is very nearly equal to that in a vacuum.

If we are to construct a fire detector using the change in the velocity of light with temperature, we must first of all inquire what effect this has.

Velocity changes

It is well known that for air the velocity of light changes by about 1 part per million for every degree Centigrade rise. For heavier gases, such as carbon dioxide, it is slightly more than this. It will be seen, therefore, that the change is of the order of 300 metres per second for every Centigrade degree rise.

The velocity is also dependent on the pressure of the air—the higher the pressure, the lower the velocity, but this need not concern us for a reason which will become apparent later.

Imagine then a beam of light which is travelling through space above a fire so that the temperature varies in the height direction (Fig 2).

If the upper part of the beam travels through warmer air than the lower part, as it might do if the beam were travelling underneath a ceiling where the hot combustion products from a fire would congregate, the beam will be bent into a circular path so that it moves downwards. Conversely, if the temperature gradient were the other way, the beam would be displaced upwards.

It turns out that if the temperature gradient through which the beam is travelling is 100 Centigrade degrees per metre, the beam will be bent into a circular path with a radius of 10 kilometres. On a 100-metre path, the beam would be deflected through a distance of 5 centimetres.

Let me now return to the point I made about pressure. If pressure is to have any effect in deflecting the beam, pressure gradients of a magnitude equivalent to the temperature gradient would have to exist in the atmosphere, but it is not possible for any large pressure gradients to exist. For example, if the atmospheric pressure changed by ½ inch mercury, say about 1½ per cent, between London and Manchester, there would be a devastating tornado.

It can be readily seen, therefore, that any pressure gradients that exist in the dimensions of a building must be vanishingly small and quite insignificant when compared with the effect of temperature changes. This at once means that any system that is devised using the deflection of light beams will be independent of draughts.

So far then, we have seen that a beam of light traversing a space in which there is a thermal gradient, will be deflected. This could form the basis of a fire detection system or the beam of light could fall on a photocell in the "no-fire" condition and would then be deflected off the photocell once a fire occurred and this could be arranged to give an alarm.

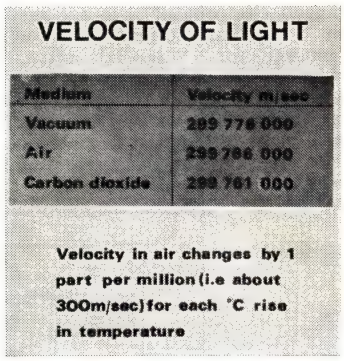


Fig 1. The speed of light varies slightly in different gases and at different temperatures.

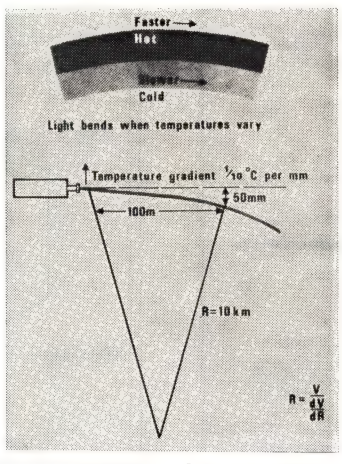


Fig 2. Variation of temperature and therefore velocity with height causes ray of light to bend.

The deflection is rather small, say of the order of 1 cm, and it follows that if the system is to be sensitive the beam of light ought to be sharply focused at the photocell.

Ordinary incandescent light sources are not suitable for this, for to produce a sharply focused beam would automatically involve sacrificing a tremendous amount of light so that the whole system would become impractical (Fig 3).

Coherent light

Fortunately, this can be overcome by using a laser, which is a coherent, monochromatic source of light. This means that the light from a laser is all of the same wavelength. In the case of the helium neon laser which is being used, this light has a wavelength of 0·6328 microns.

What is more important is that the light is emitted with all the crests and troughs of the waves aligned in contradistinction to non-coherent light in which the crests and troughs occur randomly.

The fact that the light is coherent means that we have only to put a telescope in front of the laser to focus the light to a sharp point some distance away. The sharpness depends on the diameter of the objective of the telescope and the distance of throw. The size of a spot at 100 m could have a theoretical limit with a 50 mm objective of the order of 1 mm. In actual fact, lens imperfections limit this to about ½ cm at this distance.

So far then, the fire detector would consist of a laser, a telescope, and a photocell, across the area to be protected. This would not be altogether satisfactory because fires near to the laser would affect the beam of light more than fires near to the detector, due to the optical lever effect.

Close together

It would be possible to get over this by putting a mirror at the far end of the space to be protected and returning the beam back to a point near to the laser (Fig 4). This would mean that the sensitivity of the system would not vary by more than 2 : 1 along the line of the laser. It also has the practical advantage that it consolidates the electronics; the laser and the detector are now close together.

In doing this, however, we have introduced another problem; the direction of the beam of light is very sensitive to the stability of the mirror for, as you know, the reflected beam of light will turn through twice any angle that the mirror turns through and as the throw is considerable, the whole system has

CONTINUED ON NEXT PAGE

LASER FIRE DETECTION

CONTINUED
FROM PREVIOUS PAGE

now become sensitive to building movements.

A way out of this is to make use of a corner cube reflector instead of a plane mirror. A corner cube reflector consists of three mirrors mutually at right angles so that the beam is reflected by all three mirrors in turn (Fig 5). This has the property that no matter how the corner cube moves, it will always return a beam of light parallel to the incident beam and this, therefore, overcomes the stability problem of the mirror.

However, we are still left with a residual problem of the directional stability of the laser for if the direction of the laser beam incident on the mirror were to move, the reflected beam would also move so that it remained parallel to it. This is the problem that must now be dealt with.

To understand how this is overcome, we must now go back to the bending of light beams by temperature gradients. I have talked so far as though the bending of the light beam were a steady and organised affair, but in fact it is not.

Turbulence

When a fire occurs, the column of hot gases rising above the fire is turbulent and instead of there being a nicely organised temperature gradient, it is a much more random affair, being composed of the temperature gradients of eddies. Instead of the beam being deflected steadily, it tends to dance about and the point of light becomes defocused due to the turbulence.

Of course, when the hot gases strike the ceiling they mushroom out and spread out over a wide area so that it is an advantage for the laser beam to run underneath the ceiling because a longer path of hot gas then affects it.

In compensating for the movements of the building, we have to differentiate between a relatively slow movement of the beam, due to building movement, and the wildly dancing beam that accompanies a fire. A way of doing this is to put a chequer-board mask in front of the photocell receiving the light from the laser and to make the holes in the chequer-board roughly equal in size to the undisturbed laser beam (Fig 6). Ordinarily the laser beam will fall somewhere on the chequer-board, either on a masked part or a clear part, or partially on a masked and clear part.

Light changes

If the beam moves, due to slow movements, then the light will change slowly over the photocell behind the chequer-board and it can be arranged that this will not pass an amplifier connected to the photocell.

Under fire conditions the light will dance about on the chequer-board mosaic and there will be an alternating component generated from the photocell in sympathy with light movement.

Experiments with a number of fires have shown that the best discrimination between fire conditions and normal background heating occur if the amplifier is tuned to pass a frequency of between 40 and 70 Hertz. We now, therefore, have a detector which is able to detect rising columns of heat.

Of course, such a detector must be protected against momentary interruptions of the beam and this is easily arranged electronically. In the instrument being demonstrated, the amplifier is blocked for 15 seconds after the first movement of the beam in order to cut down false alarms due to accidental interruption of the beam. The apparatus is also made to function as an ordinary smoke detector by measuring the returned intensity of the beam.

In this case, it is necessary to deflect some of the beam returned from the corner cube with a half-silvered mirror onto a photocell for an intensity check and compare this with the beam generated by the laser (Fig 7).

We now have, therefore, a detector which will either detect the smoke or the heat from a fire. It is able to detect all kinds of smoke equally well and is therefore a universal fire detector.

In fact it is the only kind of detector sensitive to both flaming and smoky fires from all kinds of fuel. Its sensitivity is such that in a building 41 m by 15 m by 12 m high, that is 135 ft by 50 ft by 40 ft high, it will detect a fire 711 mm (28 in) in diameter at any point in the building within $\frac{1}{2}$ min.

The main cost of the detector is that of the laser tube, which is thought to be about £40 if bought in quantity, and the life is guaranteed at one year continuous running. It is thought that it will last considerably in excess of this.

The likely cost of the whole system is doubtful at present but the telescope, electronics, and corner cube reflector ought not to be very expensive and it is hoped that protection can be obtained at about 8d per square foot.

Mushrooming

From what I have said about the spreading plume, you will see that it is not necessary to lace the ceiling space with laser beams because the mushrooming of the fire enables quite a wide area to the side of the laser beam to be protected. It is difficult to say how big this area could be without knowing something about the environment in which the laser has to work—this is true for any detector system.

A detector ought to be able to detect a fire, the output of which is rising at about 200 kW per minute, without much trouble. If the power sources in an area, when aggregated, are likely to vary at something approaching this rate, then any detector system will not be able to distinguish between this and a real fire. The same sort of arguments

Fig 4 (right). Reflector causes less variation in sensitivity and consolidates the circuitry.

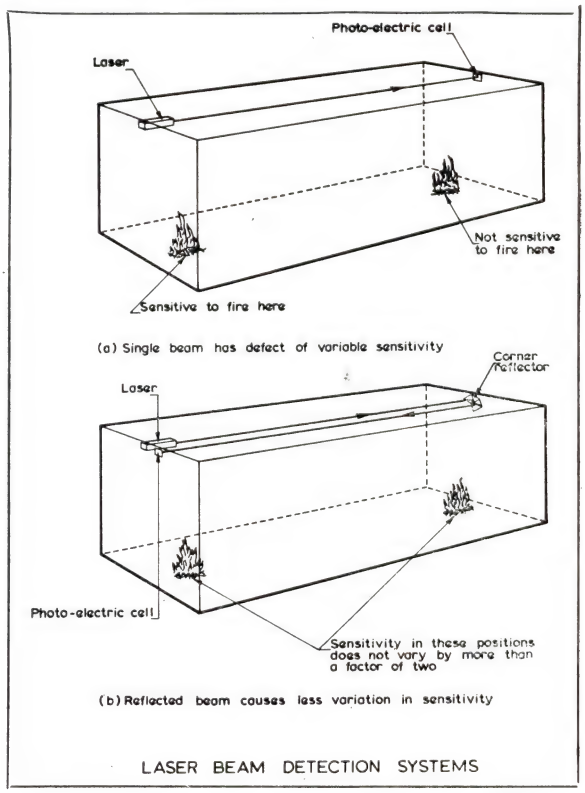
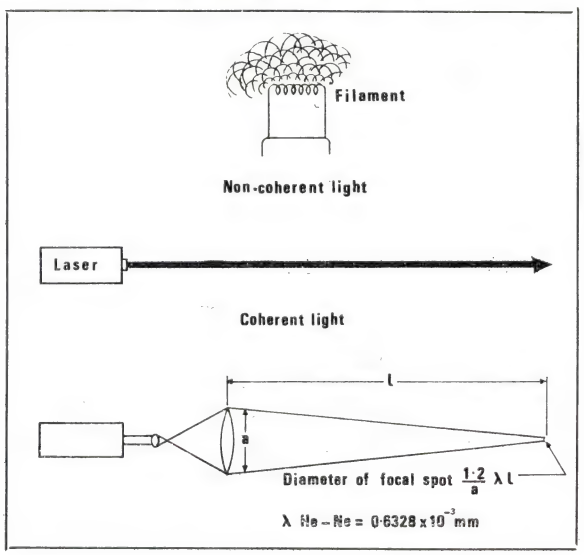


Photo-electric cell
Laser
Not sensitive to fire here
Sensitive to fire here
(a) Single beam has defect of variable sensitivity
Corner Reflector
Laser
Photo-electric cell
Sensitivity in these positions does not vary by more than a factor of two
(b) Reflected beam causes less variation in sensitivity
LASER BEAM DETECTION SYSTEMS

Fig 3 (below). Ordinary, or non-coherent, light cannot be focused sharply. Laser light can.



could be used in respect of the operation of detector systems by smoke.

In a thermally quiet situation such as a library or the ward of a hospital, it will be possible to protect a much larger area than in a thermally noisy situation such as a factory with all its variations of industrial load.

The laser detector has a big advantage over other detectors when working in high buildings because the thermal plume spreads out as it rises and, of course, it spreads out under the ceiling, and it is the whole width of this plume that is being used to deflect the laser spot (Fig 8). In fact the deflection depends on the square of the distance the beam traverses this plume.

Its sensitivity on theoretical grounds ought to fall off much less with height than point detectors, and this seems to be borne out in practice for it has been possible to detect a growing fire in a high stacked storage 160 ft above the fire.

Another advantage is that of servicing. All the electronics are consolidated at one end of the building and there is no necessity to move a great many detector heads which can be quite a costly procedure.

The laser beam is unobtrusive and is therefore ideally suited to preserving the architectural appearance of ceilings. There is no reason why a laser detector should not be used to protect a suite of offices for, if provision is made during the design of the building, the laser beam can be run through the suite if a hole is left in the partitioning walls to accommodate it. A laser detector has now been protecting a laboratory at the Fire Research Station for eight months without a false alarm.

Universal detector

To sum up, therefore, the laser detector is a universal fire detector which promises to be very economic as it provides area protection rather than wires having to run to individual heads.

It is unobtrusive and it maintains its sensitivity when used in high compartments and servicing in these locations should be relatively simple as the electronics are consolidated at one point rather than being dispersed as in the case of individual heads.

The cost of lasers has fallen dramatically during the last few years and once large-scale production is required it seems that there is no reason why there should not be still further reductions.

I hope that I have said enough to convince you that this is a fire detection system which has many features to commend it and one which I hope will play a part in reducing fire losses in the future.

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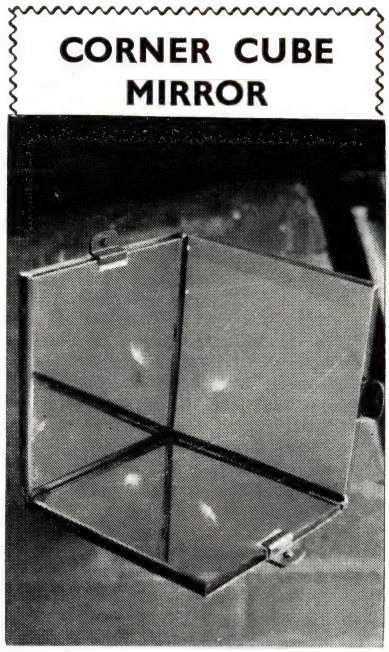


Fig 5. The corner cube mirror—always reflects a beam parallel to the incident beam.

REFERENCES

1. D. I. LAWSON. Fire losses and Fire Research. *Instn Fire Engrs Q.*, 1963, *23* (50) 107-23.
2. Jennifer E. DUNN and J. F. FRY. Fires fought with five or more jets. *Ministry of Technology and Fire Offices' Committee Joint Fire Research Organisation Fire Research Technical Paper* No 16. London 1966. HM Stationery Office.
3. D. I. LAWSON. Potential saving that might be effected by rapid fire detection. *Instn Fire Engnrs Q.*, 1970, 30 (77) 71-72.
4. Report of the Departmental Committee on the Fire Service. Cmnd 4371. London, 1970. HM Stationery Office.

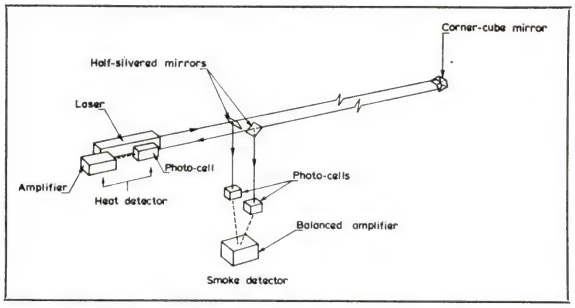


Fig 7 (above). By deflecting the outgoing and returning beams and comparing their intensity, smoke may be deflected as well as the heat plume.

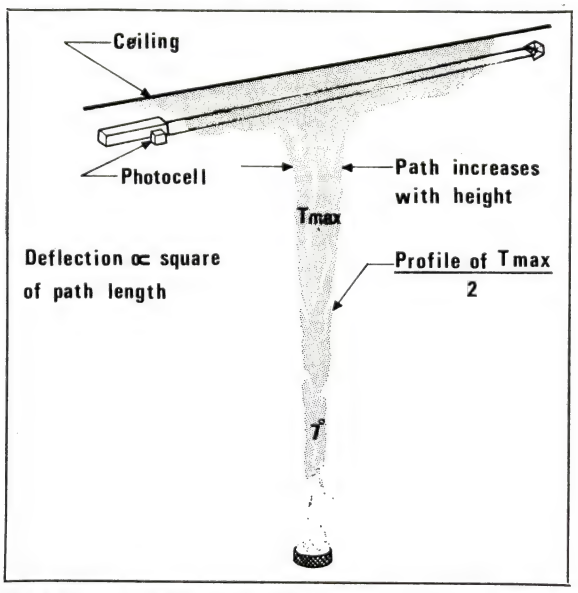


Fig 8 (above). The whole width of the hot column of gas is used to detect a fire and therefore sensitivity falls off less with height than for conventional detectors.

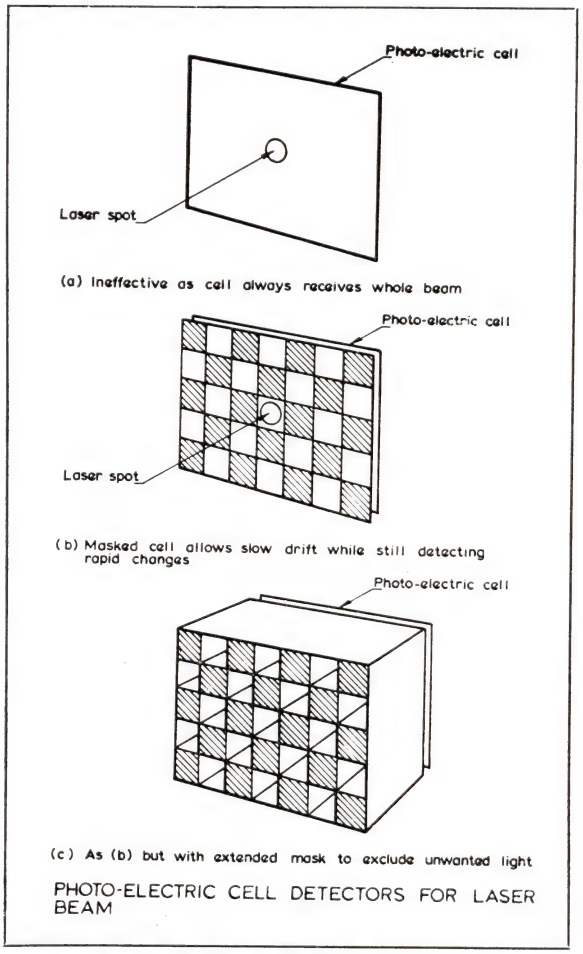


Photo-electric cell
Laser spot
(a) Ineffective as cell always receives whole beam
Photo-electric cell
Laser spot
(b) Masked cell allows slow drift while still detecting rapid changes
Photo-electric cell
(c) As (b) but with extended mask to exclude unwanted light
PHOTO-ELECTRIC CELL DETECTORS FOR LASER BEAM

Fig 6 (above). The photocell must be large enough to cover movements of laser mount. The chequer board mask changes movement to intensity variation. The extension excludes extraneous light.

FIRES IN DIESEL LOCOMOTIVES

Station Officer B. HAYWOOD, AMIFireE,
Wakefield Fire Brigade

has compiled this extract from his brigade's training programme. "It provides us with valuable information which is not available in Fire Service manuals, and is carried out with the co-operation of British Rail", he comments.

ONE of the attractions of the fire service is variety. Whether it is advice given, or a fire to be dealt with, each problem has to be taken on its own merit.

As technology progresses, the increased use of complex and expensive machinery produces new problems for the firemen.

One particular industry, British Rail, has such a problem. British Rail have 8,500 diesel locomotives which cost up to £150,000 each. A fire, or damage during fire-fighting operations to one of these vehicles can be considerable, and this type of fire has its own risks for the fireman.

Locomotive drivers are instructed how to deal with a fire in its initial stage. All locomotives are fitted with fire-fighting equipment, but circumstances may prevent the driver from using it.

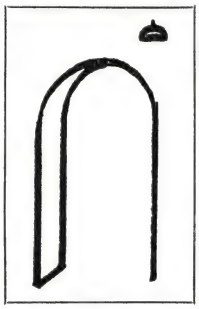
If this equipment has not been operated by railway personnel, then its use may be preferable to fire service equipment being used by the brigade arriving at the incident.

The location of safety devices fitted to diesel locomotives, and knowledge of how to operate them in an emergency, can minimise danger and, what is equally important, reduce the hazard in fire fighting.

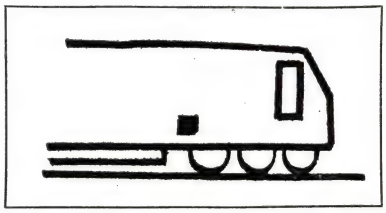
There are numerous designs and types of locomotives, so descriptions must be in general terms. The locomotives which have two driving cabs are known to the driver as "one end" and "two end". The position of equipment is identical in each cab.

The diesel generator is situated in the centre of the locomotive, and access from one cab to the other is gained by a narrow passageway which runs along one side of this generator. A fixed fire-fighting installation which is manually operated is fitted in the engine-room to protect this section of the locomotive.

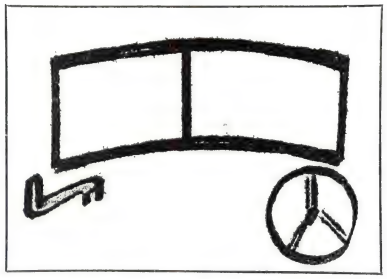
As considerable heat is produced when the generator is being operated normally the heat detectors are set correspondingly high and when actuated result in an alarm bell being rung to inform the driver of a possible dangerous situation. The driver then ascertains the cause of the alarm, and decides whether to operate the manual device of the fire-fighting installation.



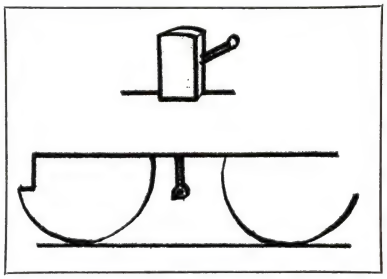
The battery of CO_2 cylinders for the fixed installation is fitted in the nose of the cab, or in the engine room. The operating point in the cab is over the door leading to the engine room. An alternative operating point is within a compartment on the right hand side of the cab facia. This compartment is protected by a chrome disc, the disc must be rotated to gain access to the operating handle.



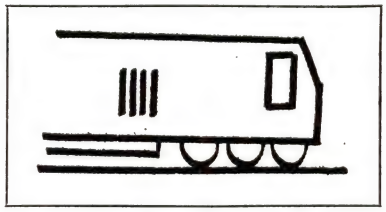
Some locomotives have operating handles in a glass-protected panel on the exterior of the vehicle.



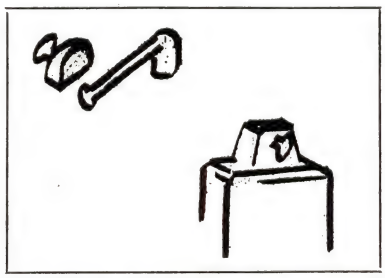
Brakes can be applied in either cab by a horizontal lever, or a wheel. The wheel brake may be located on the rear wall of the cab, or near the facia level with the horizontal lever.



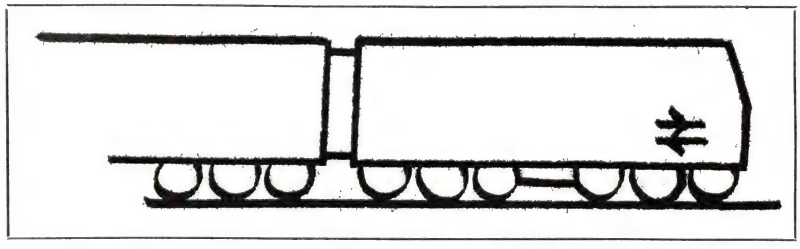
If it is required to disconnect the electric circuit, this is done by depressing a lever, located inside the engine room halfway down the passageway on the side of the vehicle body. An exterior lever is immediately below this position and is in the form of a stirrup. It is important to know that only the electrical equipment above the level of the locomotive floor will be disconnected, below this level the floor will remain live.



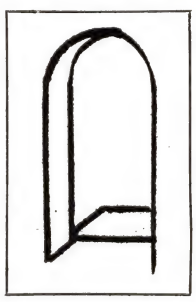
As ventilation louvres cannot be closed, an excess of CO_2 is discharged in the engine room to compensate for the gas which escapes.



Locomotives which have long bonnets have a key positioned near the driver's operating handle. This key must be removed and used to switch off the electric power by inserting and turning the key in a pillar which is situated in the engine room.



Inter City rail car units consist of two coaches, one of which has the power unit underslung. They are capable of being driven from either end, and may be operated as a single unit or a set of up to eight coaches. The coach with the power may be instantly recognised as only it displays the British Rail emblem. A fixed installation consisting of two 7 lb chlorobromomethane cylinders protects the engine. When the temperature rises above 240°F the detector operates the system. This installation is efficient, but when a fluid flywheel fractures, hot vaporised oil is thrown upwards on the underside of the coach floor above the level of the installation. This type of fire may continue to burn after the chlorobromomethane has been discharged. Complementary to the fixed installation on the locomotive are portable extinguishers for dealing with the smaller outbreaks of fires. The number and type of extinguishers vary but they are located in every cab.



Care must always be taken to avoid stepping on the first panel of the engine room floor. A fault in the electric junction box below this panel could electrify this section of the floor.

University students investigate the mobilisation requirements of Berkshire and Reading Fire Brigade and test ways of achieving maximum efficiency

Control room mobilisation schemes

by M. T. DEERE, BSc (Eng), ACGI, CEng, MIMechE

Senior Lecturer in Education,

Loughborough College of Technology

AS part of my teaching programme at the University of Reading, I used various forms of "project method". This title is an ambiguous one, and one needs to state the precise variant used.

In our case this meant presenting a group of undergraduates with a real problem from outside, and using it to develop students' thought processes and attitudes. A workable answer is always the basic goal, but one must add that, from an educational point of view, the quality of the thinking behind the answer may outweigh the answer itself.

It follows that the provider of the problem has to recognise this—it is an act of faith on his part that he will get a complete answer to his problem. What often happens is that an incomplete answer is provided in the short term, but the exercise sets in motion a train of thought that gives real benefit later on.

In the example that I am going to describe, this was probably the case, and I shall give here the general ideas that emerged, both from the student group and from subsequent thinking after they had completed their immediate task.

This particular student group studied the control-room requirements of Berkshire and Reading Fire Brigade. From our point of view we found the ideal sponsor in CFO K. Bridges, and we were given all the assistance that we needed.

Generally speaking, in all such situations it is necessary to *identify* the real problem—because most sponsors are only in a position to tell you that they *have* one, and it is the proper task of the consultant to spell it out. In this case the most worthwhile problem emerged fairly easily: the task was to maximise mobilisation efficiency.

The main features of the brigade that we first considered are worth discussing. This is, in the main, not urban territory. Twenty-two stations (three whole-time, five day-manned, 14 retained) are arranged in three divisions, with a further 15 stations (drawn from a total of seven brigades) providing normal first attendance under Section 12.

Within Berkshire and Reading there are 33 first-line appliances; first attendance and special attendance data are held on a card index system classified under about 400 civil parishes; the basic communications system is VF system "A", with emergency calls input to it from about 90 telephone exchanges.

Current practice is to operate the control room with two men, the control room being located not at brigade HQ but at Reading No. 1 fire station. In the near future, however, both HQ and control will be combined on a new site shared with the third Reading fire station.

The problem

The first step, having identified the problem, was to state it in a general way. We divided the process into seven basic steps:

1. Receive call.
2. Locate incident and identify its type.
3. Determine general attendance required.
4. Determine available attendance.
5. Determine specific attendance possible (by comparing 3 with 4).
6. Dispatch appliances.
7. Modify available attendance data.

The design problem consists of comparing and evaluating the various ways of achieving and linking these steps, and the final choice will be to some extent a compromise between reliability and cost. Implicit in these considerations will be the optimum role of the human operator. However, before embarking on an exercise of this kind, it is always as well to consider whether any improvement is really necessary.

We met a situation in which, in theory, control-room staff received a call, located it first by asking for the address, and secondly, by originating telephone number; classified it by inquiring from the caller; determined general attendance and specific attendance from the parish first attendance card; checked available attendance by reference to a wall display map carrying appliance reference counters; dispatched using a normal system "A" panel; and finally walked over and rearranged the wall map by hand. No one suggested that this system was perfect—a new control-room design was in hand and this was one of the objects of our exercise anyway.

Even so, in practice it did not work quite like this. Given normal conditions, appliances were dispatched from memory and the attendance subsequently (and more or less immediately) checked on the card. On the face of it, the system cannot be bettered under normal conditions. However, we felt that we were more concerned with peak conditions, when this approach was liable to breakdown.

In fact, the "memory" approach breaks down under two kinds of intensity, and these are significantly different. The first is intensity of

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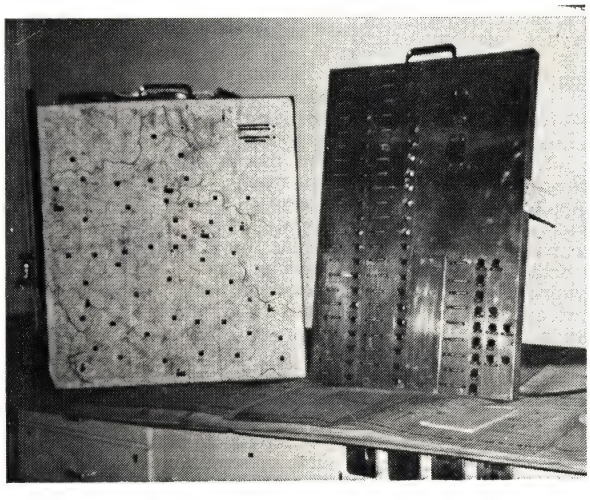
Below left: The pilot scheme of the semi-automated scheme (Fig 1).

Below right: An appliance button bank which can be incorporated with the scheme (Fig 2).



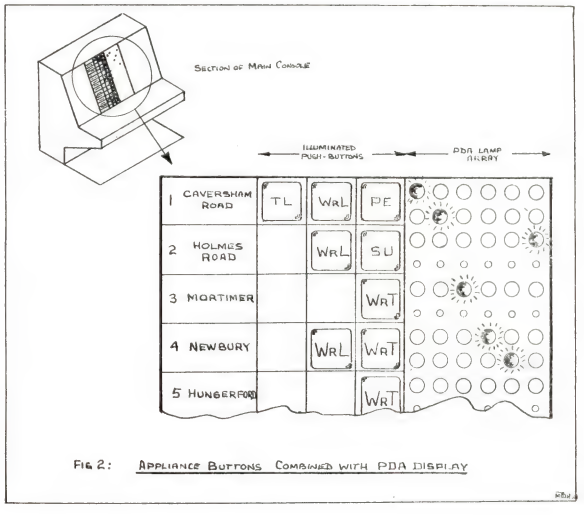


FIG 2: APPLIANCE BUTTONS COMBINED WITH PDA DISPLAY

CONTROL ROOM MOBILISATION SCHEMES

CONTINUED FROM PREVIOUS PAGE

traffic, by which I mean the rate at which calls can be received. The second is intensity of *deployment*, by which I mean the extent to which normal first-attendance appliances are not available.

We felt that a revised system would result in better performance under both these conditions, but there was still a further point. We felt that there was something to be said for enlarging the area covered by fire controls, and that therefore a more rapid system would be valuable in this respect, making it possible for the same number of staff to handle a larger number of units. This has particular point in the face of possible regionalisation.

Having digested these initial considerations, it became possible to formulate the problem more specifically. It was: to speed up the mobilising process so that it would be possible to handle a greater area, an increased intensity of traffic and an increased deployment; in doing this, reliability was to be at least as good as for the existing system. The "ground rules", or principles, of the exercise followed immediately.

1. VF system "A" to be retained unless there was an overwhelming reason for its rejection—such a reason did not appear to exist.
2. As much preplanning as was possible to be done, so as to lighten the "thinking" load on the operators. (It should be recognised that we are here stating an optimum, because you can overdo preplanning. There must come a point where the operator has to assimilate too *much* information.)
3. The solution adopted must ensure that operators do not have to leave the main console under normal operating conditions.
4. The solution adopted must be capable of extension, so that further units can be added when necessary.
5. Any solution adopted must be of such a character that complete breakdown does not paralyse the control function.
6. Cost to be minimised.

We subsequently added three more rules, as the exercise progressed, and they are worth stating here.

7. The system to regard as the *normal call* a *fire* demanding the attendance of *two* pumps.
8. Statements of special attendances (ie, special risks or special service incidents) to be rationalised. (It is current practice in many brigades to give extensive special attendance listings by nominating *specified* appliances. As will be seen, this is not always wise, because some mobilising systems can work better if *numbers* required of particular *types* of appliance are given—leaving nomination of actual machines to the operator—see Fig 5.)
9. The number of classification headings for first attendance to be optimized, even if this resulted in over-attendance on occasion.

Having identified the mobilising problem, defined it as a series of steps, and stated the principles which its solution has to satisfy, we can discuss the possible solutions themselves.

However, at the outset it became clear, as system "A" was to be retained under principle No 1, we had no scope to interfere with steps 1 and 6, concerning receipt of calls and dispatch of appliances.

Further to this, we decided to use telephone exchanges as our classification system, rather than parishes. Principle No 9 led us to this, and the price of reducing from 400 to 90 items was relatively small; while in most cases the normal first attendance was unchanged, in a few cases it would be necessary to order three pumps instead of two; if normal first attendance appliances were unavailable, the "averaging" process resulting from grouping parishes to exchanges meant that in some cases the nearest appliance was not necessarily ordered first.

Three kinds

One can choose from broadly three kinds of system. The first is the full *automatic* system, of which the computer is the main example. Having input to the computer the location and type of incident, and having arranged for the computer to be continuously informed of all appliance movements, and having comprehensively programmed the computer in advance, then the computer will tell the operator which appliances to dispatch. Sophisticated machines will do the dispatching, and up-date their availability records themselves. (This aspect was well described by R. P. R. Gaade in April FIRE.) In brief, these machines will integrate *all steps* in the mobilisation process. We did not use it because it contravened principles Nos 5 and 6.

The second type is the *manual*, and it is the most common. Its character is that it depends on cards, and carries out each step of the mobilisation process one at a time.

Our selection was drawn from the third group, which we may call the *semi-automated*, and which are characterised by combining some of the steps, while still leaving some flexibility to the operator. Under peak conditions they are quicker, and in terms of cost they are many times cheaper than the computer. I shall describe three.

Pilot scheme

The pilot scheme is shown in Fig 1, and it works like this. You give the operator two banks of push-buttons or, in this example, switches; the first—on the right—is for appliances under his control, arranged under normal stations. Each appliance is given a light on a wall-map, the light is normally on, but pressing the button will extinguish it. The second bank of buttons gives telephone exchanges arranged alphabetically, and the system works like this.

On receipt of the call, the operator determines the originating exchange and presses the appropriate button. The system takes over and presents three types of data; it lights up its area on the wall map; it lights a bulb on the map over the stations providing normal first attendance, so long as appliances are available at that station—if they are not then the indication is not given; lastly it presents on a console panel the numbers of the next nearest appliances, up to six in number (in the pilot model shown there are only two).

The system can be extended by presenting the nearest special appliances, or the method of presentation can be varied. For instance, it can display all attendance requirements in digital form, by eliminating the station bulbs on the map, or it can present the information by an array of lights combined with the appliance button banks (see Fig 2). In essence this method combines steps 3, 4 and 5 and partially includes steps 2 and 7.

Its attraction lies in the suppressing of indication for all appliances that are not available, thereby carrying out some of the logical thinking otherwise done by the operator, and leaving him free to obtain the address and other details from the caller. In this way it can improve performance under conditions of peak traffic and peak deployment.

There are, however, drawbacks. The system demands a large number of connections, even though the electrical principles used are simple enough.

The programming lies in the electrical circuits, and connecting these can be complicated. It is possible to programme each exchange attendance as a separate unit, which makes up-dating possible, but this is a skilled task. Further to this, such unit wiring is more expensive. Again, the problem of special risks is not easy to incorporate.

The solution proposed to this area of the problem is to mount a large scale map of the district in question on a slide, place the slide in a magazine, and select for display on a special screen using the exchange push-button. Marked on the map would be the special risks with their required attendance.

This system is considerably cheaper than the programmed circuit, it is quicker to install and considerably quicker and easier to up-date. The penalty for these advantages is that it takes longer to process a call, although it is still considerably quicker than a manual system under peak conditions.

Although the physical characteristics are very different, the operating principles are very similar to those of the programmed circuit. It should further be said that, compared with the programmed circuit, the punched card allows for the addition of more information with a minimum of cost and trouble.

For each exchange area we prepare a card, punched as shown in Fig 3. This allows for the nearest six appliances to be presented, and in terms of scope covers the availability of 16 appliances. Colour codes are used to distinguish special ladder equipment (eg, PE, WrE, WrL) and also appliances carrying rescue equipment.

Twelve such cards are placed on a vertical drum mounted in the console (Fig 4) and in the case of Berkshire and Reading the brigade area is covered by eight drums. In this case, pressing the exchange button illuminates the appropriate drum, and the operator rotates the drum by hand to discover the exchange card. The drum contains 16 illuminated rows, each of which represents an appliance.

If the appliance is not available—because the operator has removed it by pressing the appropriate appliance button—the row will not light and that particular punch on the card is effectively removed. In practice, we achieve the same presentation as with the pro-

grammed circuit, with a much simpler electrical system.

The main disadvantages of the drum are twofold. Firstly, a lot of space is required and, as a result, cards have to be small. This limits the information displayed. The space required is not so much concerned with panel area—which is quite small—as with volume within the console, because each drum is 8 in high and 16 in in diameter.

The second drawback is that the drum makes it difficult to mount the lights and to change them. Because of these, we proposed the third and final system to be discussed.

This system uses an almost identical electrical system. However, the drums are replaced by flat translucent panels, mounted on the console with simple bulb banks behind them. The space saving is significant and the mechanical construction is considerably simpler. The cards are stored in racks, and placed on the panels by hand.

More information

It should be remembered that compared with the normal card index system in use the number of cards is very much less overall. The result of this is that larger cards than those on the drum can be used and this leads both to fewer panels and to each card carrying more information.

The penalty is that this system is slightly less rapid compared with the drums. The mode of operation is as follows: 1. Depress appropriate telephone exchange button (this locates the card and illuminates the adjacent panel); 2. Place card on panel and read off information.

Fig 5 shows an example of a card suitable for use in the panel system. It is possible to add further columns to indicate next nearest PE/WrL appliances—if these do not figure in any likely first attendance situation they may be significant in special risk attendances.

You will also notice that it becomes possible to add special appliances as part of the "automatic" system, and to give special attendance information on the card itself. The illuminated panel is in fact divided into two by a vertical strip—one bank of light rows refers to pumping appliances and the other to special appliances. This, as noted earlier, is classified rather differently.

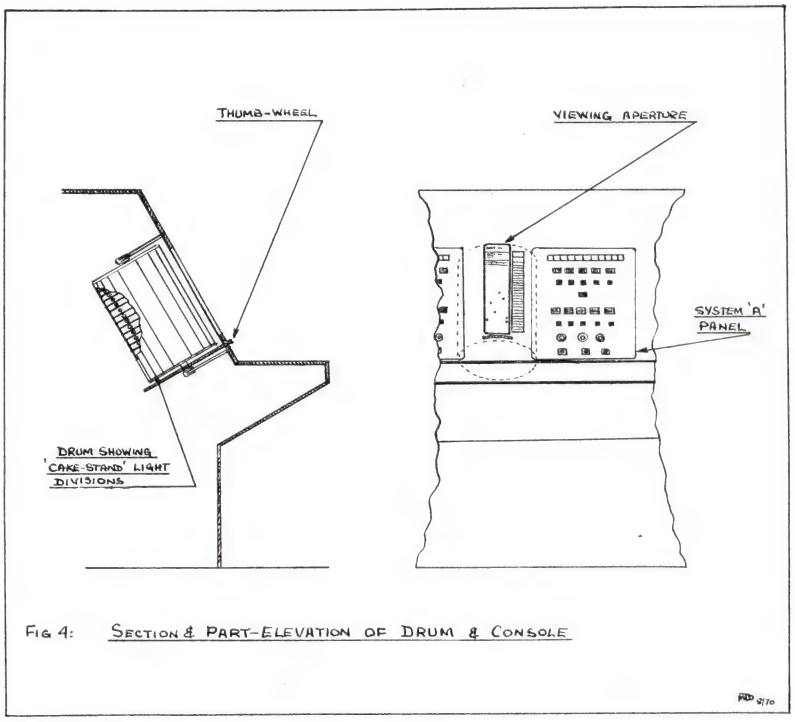


FIG 4: SECTION & PART-ELEVATION OF DRUM & CONSOLE

Now that it is possible to give the operator concise and correlated data on availability, he is able to select appliances more quickly. If, for a special risk, he is given a list of nominated appliances, and if one or more of those is not available, he may face a dilemma.

For instance, is Station 17 WrL listed because of its proximity or because of its equipment? Similar considerations apply in reverse for over-the-border calls.

The next nearest appliance may be on the station of another brigade. If it is available this is all right; if it is not, then a request for attendance to the neighbouring control may result in the ordering of one of their appliances which is not the most appropriate.

Grouping of exchanges is a matter of compromise. To give approximate figures: we could cover the brigade's 90-odd exchanges with four panels adjacent to racks containing 50 cards each and up to 24 appliance indications each.

We feel that the panel system will satisfy completely the nine design principles that we originally set. Compared with the drum, the panel system is cheaper, quicker and easier to install, while its larger display of information more than compensates for its slower operating time.

The system achieves its object of speeding up the mobilising process under peak conditions because

(i) it reduces the number of first attendance classification headings by 75 per cent,
(ii) it up-dates the display of appliance availability remotely,
(iii) it combines the presentation of normal first attendance, next nearest appliances, and availability of appliances into one display.

Considering costs for this scale of operations, a programmed wiring system

CONCLUDED [ON PAGE 386

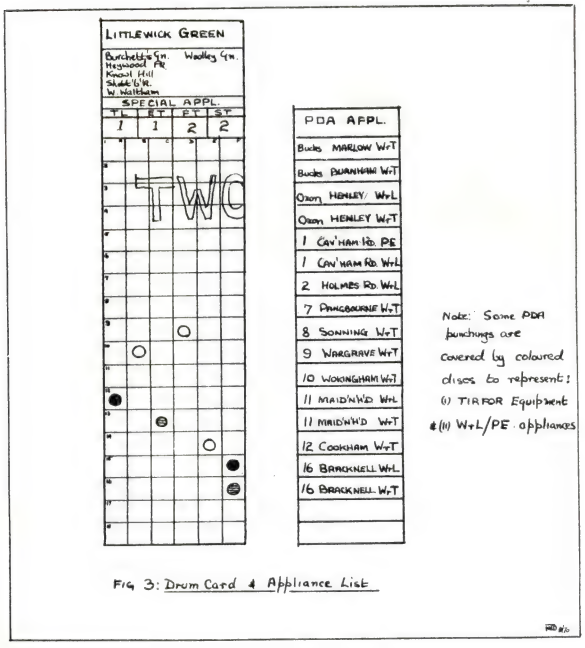


FIG 3: Drum Card & Appliance List

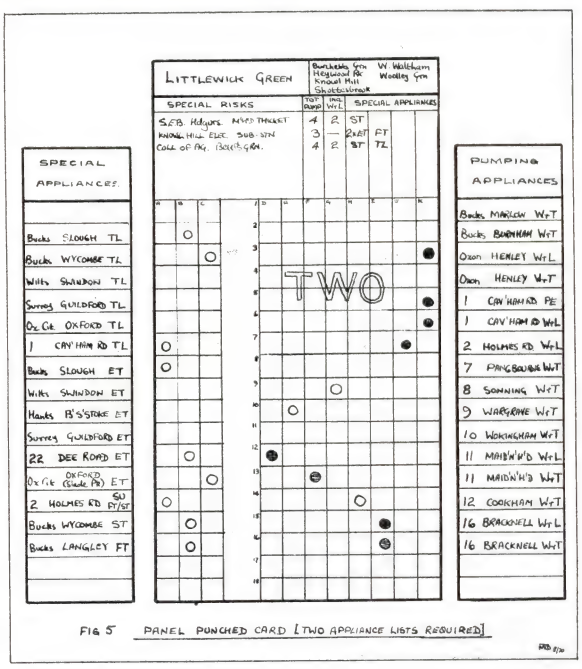
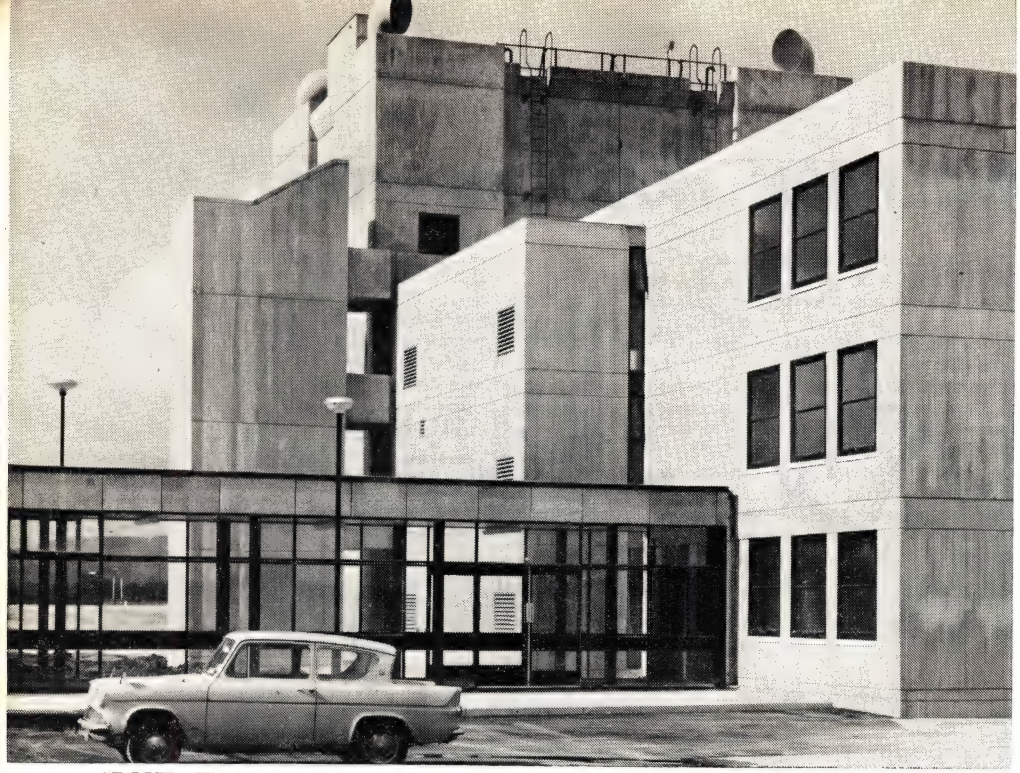
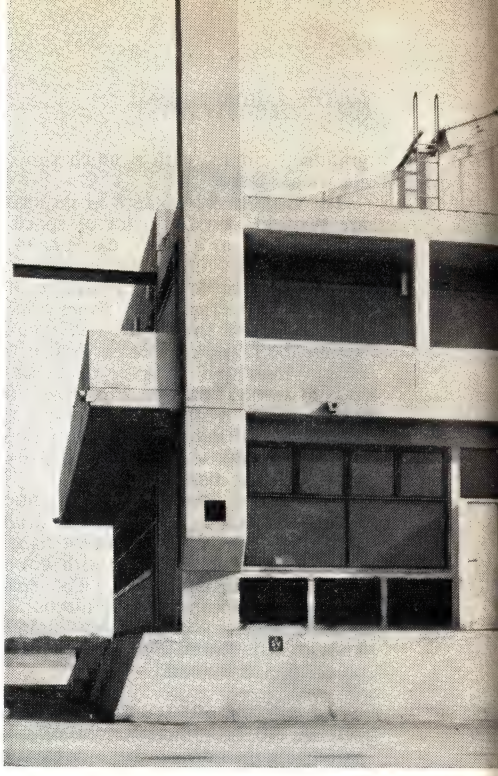


FIG 5 PANEL PUNCHED CARD [TWO APPLIANCE LISTS REQUIRED]

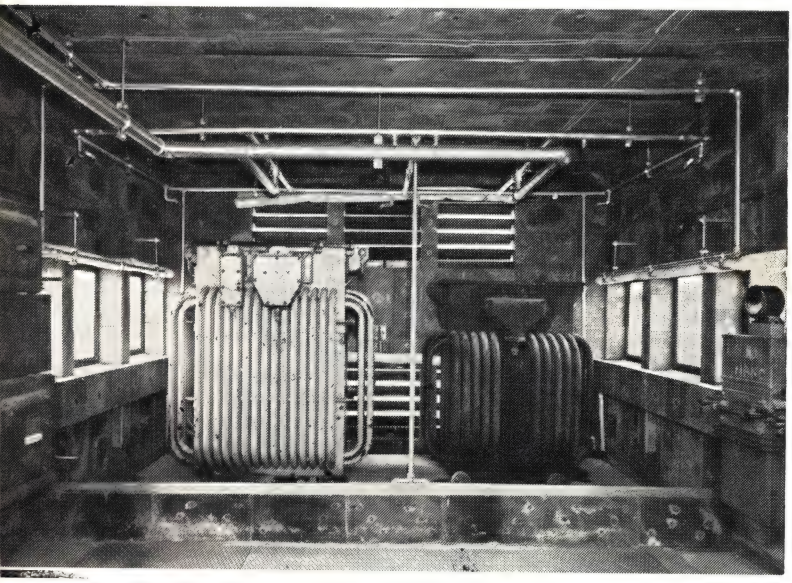


ABOVE—The breathing apparatus block of the control tower complex contains the search and hazard areas—or "jungle"—and a ship's deck with hold underneath. The complex also houses a data logging system for analysing weather and fire conditions, muster areas, rooms for lectures and practical instruction, first aid and facilities for recharging BA cylinders.

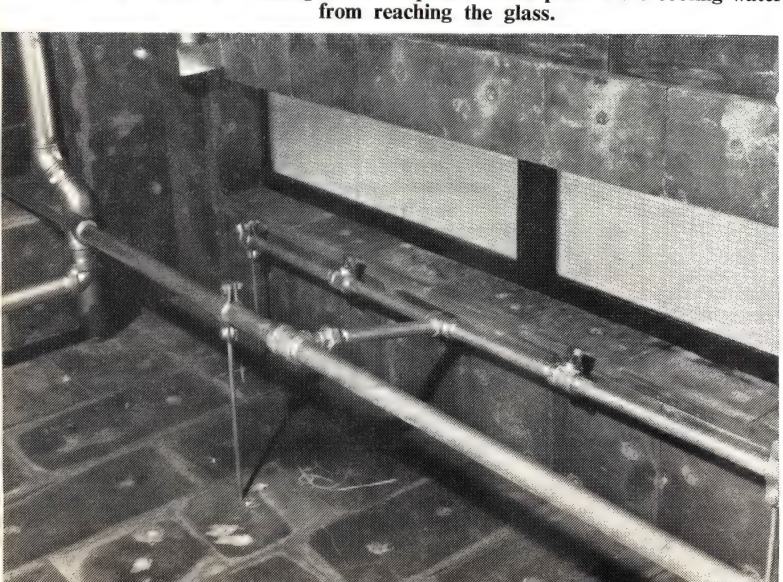


Two-storey building simulating a loading bay and wareh ventilators designed to survive repeated fires. As in all t exposed facings protected with refractory tiling. Walls tiles, specially developed to withstand a face temperatur

BELOW—Interior of the electric transformer house with two transformers and their associated switchgear and distribution boards. It contains facilities to simulate fires caused by the spillage of oil or explosion of the transformer or switchgear.



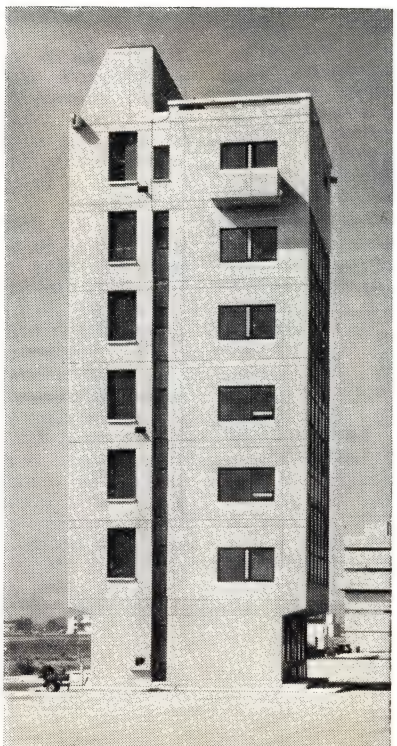
BELOW—All windows are of wire-reinforced glass and are protected from heat breakage by water running down the inside face from drenchers. Glazing is imbedded in a heat-resistant mastic material as putty would melt and the oil running down the panels would prevent the cooling water from reaching the glass.



THE FIRE B
MORETON

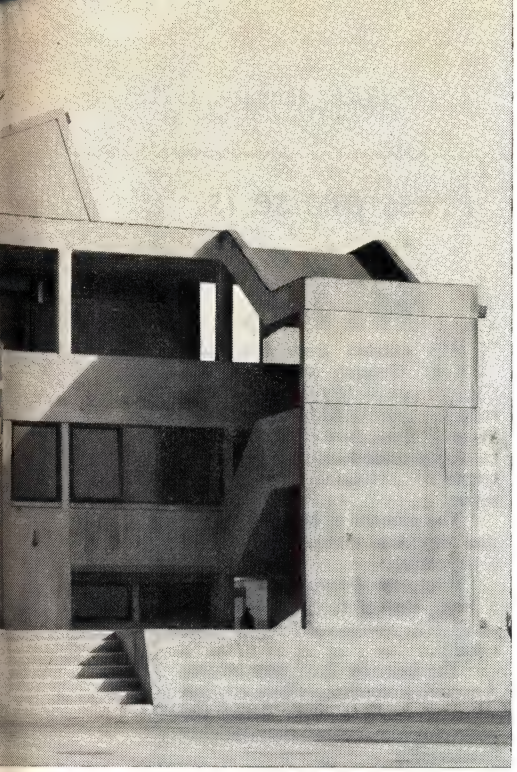
"The Fire Service Technical College at Moreton-in-Marsh is absolutely first rate. In this respect, we lead the world. . . . In the Fire Service people the world over look to what we are doing in this country and the Technical College is something they come to see and admire. . . ."—Mr. Merlyn Rees, MP and a former Parliamentary Under Secretary at the Home Office, speaking in the House of Commons debate during the second reading of the Fire Precautions Bill, 1970 (see page 369).

Phase I of the construction at Moreton-in-Marsh has now been completed at a cost of about £2 million—approximately half of the total cost of the redevelopment. Phase I

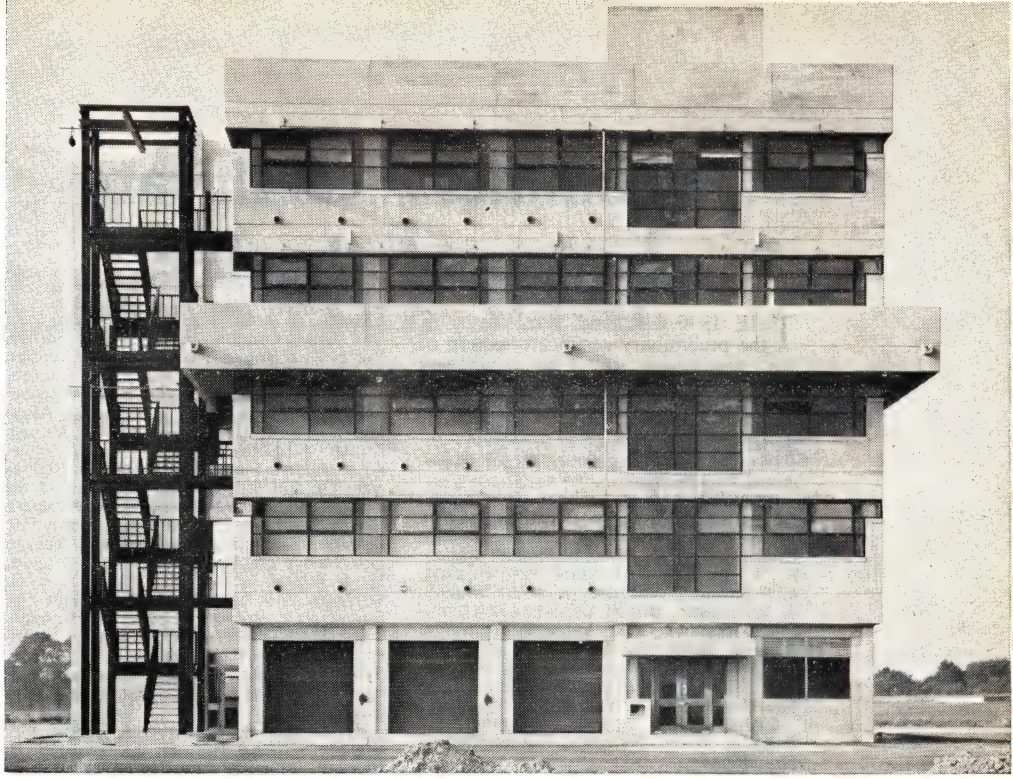


The eight-storey drill tower is fitted with different types of windows. Underneath is a sewer network.

Part of the interior of the thr here, a fireplace with a woo installed as it represents a h throughou



use with a north-light pitched roof incorporating automatic
e fire buildings, construction is in concrete with all internal
nd ceilings are covered with two thicknesses of refractory
of 1,000 degrees Centigrade and rapid cooling with water.



ABOVE—A garage workshop and petrol station are simulated on the ground floor of this five-storey building with the floors above partitioned into offices, etc. Various types of fire-resisting doors and roller shutters are incorporated and there is also a sprinkler system. In the basement there is a mock-up of a typical boiler heating installation with protection devices.

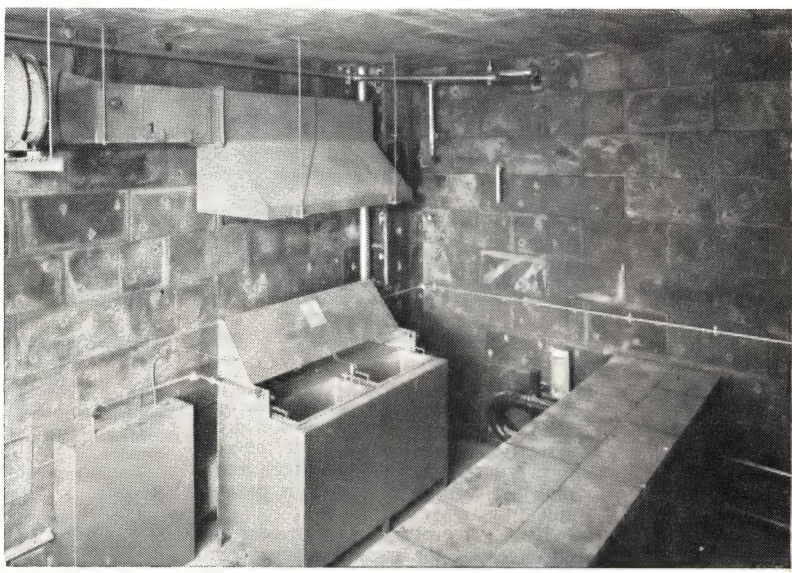
UILDINGS AT
-IN-MARSH

includes the fireground facilities, some of which are shown here, staff houses and 11 blocks of study bedrooms to provide individual accommodation for the 470 students who will be able to attend when the redevelopment is completed in 1973.

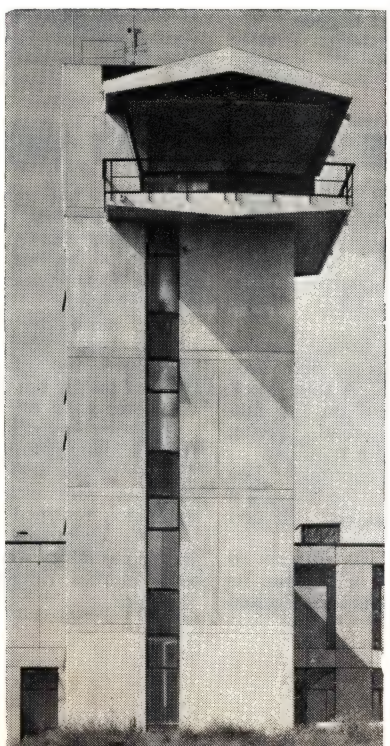
Phase II includes the administration block and instructional centre with classrooms and demonstration rooms equipped for the most modern audio-visual aids, laboratories, lecture theatre, the mess building and sick bay. Also in this stage of the development is the addition to the fireground facilities of a simulated 3,000-ton ship with a cabin complex and dock and quay-side buildings.

Phase III of the building includes transport workshops and garages and the provision of full sports facilities.

BELOW—The fish and chip shop which is incorporated into one of the fire buildings to allow practice on a commonly met fire situation. In all the fire buildings nominal central heating is provided by pipe coils to prevent frost damage to the refractory tiles.

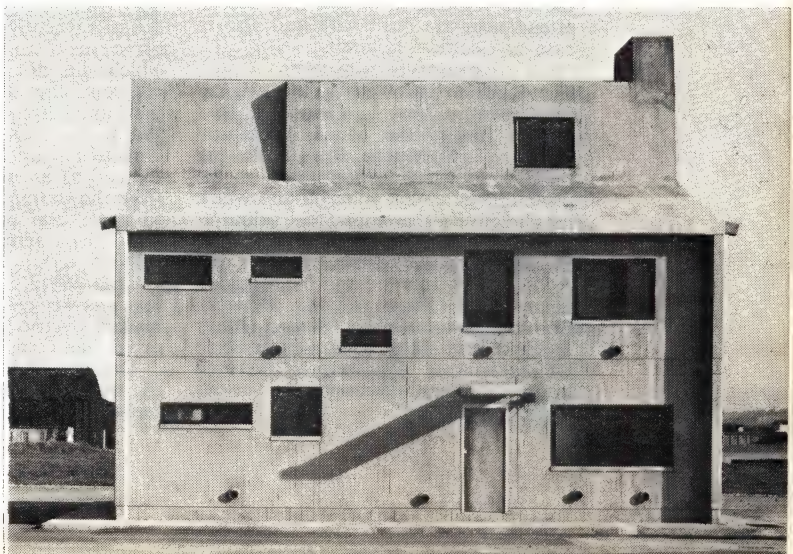


The control tower with two-way radio communication —nerve centre of the whole of the fire training area.



-bedroomed house. One fitment
n hearth, has been specifically
ard still found in older homes
the country.

BELOW—A three-bedroomed, two-storeyed house of about 1,500 sqft with a two-pitched roof and containing an oil-fired central heating installation. In all the buildings doors are constructed of a timber sub-frame encased in foil, with panels of a special type of asbestos board. All the materials used were decided upon following tests at the College.



Preliminary certificate passes of the IFE

THE 1970 UK and Eire passes in the preliminary certificate section of the Institution of Fire Engineers examinations are as follows:

BEESTON: J. L. Higton, Stanton and Staveley Works and Nottinghamshire Fire Service.

BELFAST: A. Kelly, Belfast Airport (Aerodrome Fire Service).

BIRMINGHAM: R. F. Allen, British Leyland Motor Co.; H. H. Babington and H. Banks, Dunlop Fire Service; K. A. Bradley, Leyland British Transmissions Branch; R. A. Bray, Warwickshire Fire Brigade; M. P. Edwards, West Bromwich Fire Brigade; J. W. Hawtin, British Leyland Ltd., Longbridge Division; L. J. Ingrams, Army Fire Service; E. J. Jordan, Rover Co. Ltd.; D. L. Penn, Army Fire Brigade, Kineton; A. C. Roberts, Worcester City and County Fire Brigade; A. S. Young, Fort Dunlop.

CARDIFF: A. J. Bills, Somerset Fire Brigade; A. H. Meredith, Monmouthshire Fire Brigade.

CARLISLE: W. G. Richardson, Army Fire Service, C.A.D. Longtown.

COVENTRY: B. Stead, Massey Ferguson; N. K. Winnett, Warwickshire Fire Brigade.

EDINBURGH: A. Finlay, Air Force Dept. Fire Service.

GALWAY: N. Murphy, Limerick County Retained Fire Brigade.

GRIMSBY: K. Hinch, Lindsey Fire Brigade.

IPSWICH: K. Banham, D. C. W. Raymond and H. T. Wilson-Webb, Air Force Dept. Fire Service.

LEEDS: A. J. Bell, Rowntree Mackintosh Ltd.; M. Fanthorpe, The Pyrene Co. Ltd.; J. T. Illston, West Riding Fire Brigade.

LIVERPOOL: R. Grogan, Liverpool Fire Brigade; A. J. Reid, Liverpool Salvage Corps; S. J. Stamp, Shell Refinery Fire Service, Stanlow.

LONDON: J. S. Bennett, London Fire Brigade; W. F. Coleman, Hertfordshire Fire Brigade; R. J. Gower, Ford Motor Co. Ltd.; D. F. Greer, London Fire Brigade; R. Hartley, Surrey Fire Brigade; G. B. Hatton, London Fire Brigade; S. J. E. Jinks, CIBA Laboratories Works Fire Brigade; M. Kitchen London Fire Brigade; C. L. Matthews, AFA-Minerva Fire Defence Ltd.; P. Money, British Airports Authority; J. J. Neale, AFA-Minerva Fire Defence Ltd.; D. Redgewell, London Fire Brigade and Ford Motor Co. Fire Brigade; R. A. Rooke, Hertfordshire Fire Brigade; B. R. Thornton, London Fire Brigade; A. L. Wallace, Unilever Welwyn Fire Service and Hertfordshire Fire Brigade; M. J. Whitty, London Fire Brigade; F. G. Williams, Ford Motor Co. Forge Plant Fire Squad; P. E. Wilson, London Fire Brigade.

MANCHESTER: A. D. Campion, Manchester Airport Fire Brigade; R. G. Collins, Pyrene Co. Ltd.; C. Cunliffe, Blackburn Fire Brigade; A. H. Short, Manchester Fire Brigade.

READING: R. P. Douglas, AERE Fire Brigade, UKAEA Harwell, Berkshire; R. H. Hickling, Industrial Fire Prevention.

SOUTHAMPTON: A. D. Campbell, R. Earl and P. J. Moss, Hampshire Brigade.

OVERSEAS

AT overseas centres the passes for the preliminary certificate section of the IFE examination are as follows (with the exception of the South Africa results which will be promulgated when the papers have been received):

ADELAIDE: R. H. J. Clayton and W. W. Haby, South Australian Fire Brigade.

BRISBANE: C. S. Chambers, Post Master General's Department; D. N. Madden, Brisbane Metropolitan Fire Brigade.

DARWIN: A. Spires and E. L. Turley, Northern Territory Fire Brigade.

MELBOURNE: G. L. Cameron, Port Emergency Service, Melbourne Harbour Trust; R. M. Constable, Country Fire Authority, Geelong; D. J. Halford and R. Kilford, Port Emergency Service, Melbourne Harbour Trust; R. J. Spencer and K. G. Tait, Melbourne Metropolitan Fire Brigade; D. L. Thorn, Country Fire Authority, Gisborne.

HONG KONG: Man-Chuen Chan, Hong Kong Fire Service.

KUWAIT: M. A. M. Abukhamseen, Kuwait Oil Co.

MAURITIUS: J. Fekna, Government Fire Service.

TAUPO: A. P. Donald, Taupo Volunteer Brigade.

TIMARU: G. D. Ireland, P. R. de Joux and A. P. Menzies, Timaru Fire Brigade.

TRINIDAD: C. N. Ramsaroop, Trinidad and Tobago Fire Service.

Mobilisation schemes

FROM PAGE 383

is at worst one-tenth of the cost of a computer system, a punched card drum system is about one-tenth of the cost of a programmed wiring system, and a punched card panel system is cheaper still.

Thus, on grounds of both cost and effectiveness, the use of punched card displays for mobilising purposes is worthy of detailed consideration.

It should be pointed out that whichever system is adopted it will be necessary to retain a duplicate set of p.d.a. cards, including special risks for use by the duty officer, to ensure that special attendances are dealt with and also in case of electrical failure.

ACKNOWLEDGEMENTS

The students involved in the original exercise were Miss L. Grindrod, BSc, Mr. D. Buttle, BSc, Mr. J. Thompson and Mr. T. N. Mudge, BSc. Following their work, which concentrated on the programmed circuit solution and which led directly to the subsequent solutions described, I must gratefully acknowledge the collaboration of CFO Bridges and ACFO T. M. Ingram, and the brigade's Senior Staff Officer (DO G. Hedges), Communications Officer (Station Officer J. Cull) and Mobilising Officer (Sub Officer Barker). We were all involved in proposing and discussing the various ideas.

Press praise is 'quite a refresher'

THIS extract from the John Kent Column of the *Selby Gazette and Herald* has been received from CFO K. L. Holland, West Riding Fire Brigade. "It comes as quite a refresher", comments Mr. Holland. The extract reads:

"The amount of help we needed that day was almost endless and it all came.

"First, the firemen: they were a team, they were quick, properly equipped, competent, calm and careful.

"The heat by then was turning the roof timbers to charcoal, but with two engines, three hoses and breathing apparatus, they quickly mastered it.

"They did not just put out the fire at any cost; from the start they were putting down protective tarpaulins over furniture and using the hoses economically so that the amount of water damage was trivial.

"Then when the fire was out they set to and cleaned out the heart-breaking piles of burnt and sodden junk, and they also spread and fixed a tarpaulin over the gaping roof-hole to keep out the rain.

"The standard of service was very high."

BSI fire safety code for computers

THE British Standards Institution has published the first safety code in the world to deal with the fire hazards of computer installations and the ravages which can be caused by unsuitable fire-fighting methods. It was prepared following urgent requests from industry and a number of major fires in such installations.

Fire protection for electronic data processing installations (CP95) is available from the BSI Sales Branch, 101 Pentonville Road, London N19ND, price 12s.

BUS BLAZE INCIDENT AT BLETCHLEY

BUCKINGHAMSHIRE Fire Brigade was recently called to a bus on fire on a main road—a simple message, which did not indicate what was to confront the officer-in-charge of the first appliance, reports CFO W. M. Ward.

Bletchley appliances turned out to the call to an address some 600 yards from the station at 2145. A single-deck 53-seater bus was found on fire and positioned across the road, having collided with a taxi and a mini car.

CFO Ward's report continues: The taxi was wedged between the bus and a broken electric-lamp standard (the taxi driver had escaped).

The rear of the taxi was adjacent to the main entrance door of the bus, its fuel tank fractured, the fuel had ignited and flames had spread over the entire length of the bus.

The mini was embedded in the front off-side of the bus, the two occupants having been released before the arrival of the brigade.

The wall of fire was some 20 ft high and a check confirmed that the 15 passengers and driver on the bus had escaped the fire but there were numerous casualties lying on the pavement.

The fire was dealt with by two jets from a hydrant and two hose reel jets. The stop was sent at 2211 and after assisting with clearing the road all appliances returned at 2331.

It was eventually ascertained that six of the casualties were taken to hospital with injuries ranging from shock to fractures.

Recruitment suffers as personal attacks on fire-fighters persist

THE AMERICAN FIRE SCENE

FIRE House No 9, in Cleveland's east side ghetto, has all the earmarks of a police station. Squad cars are parked in the driveway. Armed policemen stand guard. They have been on duty since firemen were shot at a few weeks ago.

Ghetto residents use other weapons against firemen more often than bullets. The other day stones rained down on No 9's hook and ladder rig from a bridge, while firemen worked below to put out a blaze in a railroad car.

Such persistent harassment, almost a daily occurrence here in New York, Washington, Detroit and many other cities, has made recruiting of firemen more difficult and has left fire officials and the city authorities puzzled.

Why, they ask, would anyone want to hurt a conscientious man who might be taking serious risks to save lives and protect property?

Several explanations are offered. Most firemen and fire chiefs feel that "the establishment", with the uniform as one of its symbols, is under attack rather than individual firemen. Some attribute this to the influence of "revolutionaries" among youths.

Racial hostility

Others blame racial hostility. Most of the trouble is in black ghettoes, and American fire departments are overwhelmingly white.

Black firemen frequently charge that there is bigotry within fire departments and that resentment in the ghettoes is a bigger reason for attacks on firemen than opposition to a vague concept such as "the establishment". White fire chiefs invariably concede that it would help to have more blacks in firemen's uniforms.

But officials point out, too, that black firemen have also been the target of stones, and that firemen sometimes encounter abuse on college campuses and in low-income white neighbourhoods as well as in black slums.

Whatever the reasons, the perils of the job have escalated swiftly in recent years.

In Washington, firemen wear heavy leather neckpieces now as well as plastic face masks. Washington, Boston, New York, Newark and other cities have installed shields on trucks to ward off missiles. New trucks come with enclosed cabs. Plastic domes are provided for the rear tillerman.

In recent weeks there have been many incidents. Fire houses in St. Louis have been repeatedly fired into by unidentified gunmen.

Washington firemen trying to reach blazes on the American University campus were pelted with stones until the police moved in with tear gas.

Earlier, youths at Howard University in the capital drove off firemen responding to an alarm, then set the pumper afire.

In Pittsburgh, men bent over fire hoses were slugged with wrenches. Black militants entered one Pittsburgh station to hit firemen.

Last week firemen battling a blaze were shot at in Chicago. Firefighters answering a call in Miami the following day were bombarded with stones and bottles.

Death and injury at the hands of snipers has diminished with the reduction in ghetto rioting since 1968, but false alarms intended to lure firemen into stoning range have soared.

"The false alarm rate is completely out of control", said Capt. Charles A. Lewis, president of the Pittsburgh fire-fighters union. "More than 60 per cent of our runs are false. That's when most harassment takes place."

"Firemen in many cities will no longer go to certain call boxes without a police escort", said Donald O'Brien, general manager of the International Association of Fire Chiefs in New York.

Civil disturbance procedure by the New York City Fire Department.

An examination of fire department troubles in several cities showed that false alarms were increasing in most of them. They have soared by 237 per cent in the District of Columbia in the last four years, for example, with 1,437 last month.

"False alarms are a tremendous morale problem", said Joseph H. Mattare, fire marshal for the District. "They are beating our men to death and wearing down our equipment."

"The harassment is very disturbing", said Safety Director Benjamin O. Davis, Jr., the top-ranking Negro general, when he retired from the Air Force last February to head Cleveland's police and fire departments. "It very definitely hinders recruiting."

Jack Gannon, president of the Cleveland fire-fighters union, said that the increase in false alarms had more than tripled the workload since 1961.

Firemen work up to 60 hours a week in some cities at relatively low pay (only Chicago has reached $12,000 a year), and many must "moonlight" to pay their bills.

"We were making 8,000 runs a year in 1961", Mr. Gannon said. "Last year it was 27,000, with a smaller force."

Cleveland, with an authorized force of 1,500 firemen, now has 1,292. Fifty new firemen were appointed in February. All were white. A third of the city is black, but only four per cent of the Fire Department is.

Cleveland's ratio is typical. Washington has the largest percentage of black firemen, one-fifth of the force, but the city is 70 per cent black. Some Southern cities, such as Jackson, Miss., have no black firemen. New York has four per cent. Detroit, about half black, has 3·5 per cent.

The Detroit force is 144 short of authorised strength. Scores are retiring early, said Earl Berry, president of the Detroit fire-fighters union, because "the people are fighting the firemen".

"Five months ago", he said, "one of our hook-and-ladder trucks was riddled with bullets while putting out a fire. Two weeks ago we had a fire-fighter hospitalised after he was hit with a bottle. We've had several court cases this year with firemen testifying against citizens. One got six months for kicking a firemen in the shins."

"Bricks and bottles and obscene language are becoming more common each day", said Detroit's Fire Chief, Lester Emery. "The police are shorthanded, too, and it's impossible for them to accompany us on every run."

"Large groups are retiring because the job isn't what it used to be. People used to love to see firemen. Firemen are life-savers. Now they are greeted with rocks and bottles instead of open arms."

Many fire chiefs say it would help to have more blacks, but few apply and many who do fail the civil service exams.

"It's not our fault", said Fire Chief Lawrence L. Kenney of Miami, whose 670 fire-fighters include two Negroes.

Irish and Italian and other white

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CONTINUED ON NEXT PAGE

THE AMERICAN FIRE SCENE

CONTINUED FROM PREVIOUS PAGE

ethnic groups have traditionally monopolized fire department jobs, with fathers encouraging sons and nephews to join.

The Internation Association of Fire Chiefs signed a contract this month to do a one-year study for the Labour Department on hiring the disadvantaged and obstacles to it. The black firemen's organisations in the major cities met to discuss the same problem.

In St. Louis black firemen have filed suit charging city officials with racial discrimination. The blacks demanded better racial balance in fire stations, recruiting of Negroes and equal promotion practices. They charged many white firemen were bigoted.

In August, 1968, 100 black firemen in Washington filed charges with the Human Relations Council there that they were given a separate breathing device for the rescue squad so whites would not have to put their mouths on the same machine.

Beds were set aside in the station houses, they said, for use only by blacks. This was the practice in Baltimore, also, until city officials stopped it.

"I don't know why the members of minority groups have this hesitancy about joining the department", said Fire Chief C. R. Cook of Houston.

Non-residents

Black firefighters offer specific reasons, including these: discrimination, civil service tests "designed for whites", recruiting of non-residents of a city in competition with ghetto dwellers, and automatic elimination of men with token police records.

"In the ghetto", said Brother Diablo of the black United Community Center in Cleveland, "you can get a police record by just standing around."

"Blacks want to get in", said Lieut. Donald Brown of the Philadelphia fire department. "But a ghetto education does not prepare those who would like to be firemen for the civil service exams."

Mr. Brown, a member of the board of directors of the all-black Club Valiants, Inc., an organisation of Philadelphia fire-fighters, said that an increase in the number of blacks in fire companies would reassure citizens in the ghettoes that the system was not racist and that axe-wielding firemen intended no unnecessary damage to property.

Special knowledge

Black firemen contend that black residents should be given preference in a city over the many white fire-fighters who live in suburbs. They believe examinations should be devised that do not favour applicants who can answer irrelevant questions about history or who have special knowledge of the fire department because they have friends or relatives in it.

Because firemen live and sleep in close proximity, there is more potential for racial friction than in a police department, but many firemen say close quarters pose few problems in fire houses after the first period of adjustment following integration.

BATH'S RIVER-RESCUE CRAFT

Bath Fire Brigade's river rescue craft turning at full power with its normal crew of two on board. It is kept permanently inflated and can be easily transported on land on a standard-type two-wheeled boat trailer.

Increasing waterway emergencies call for special equipment

Report from CFO N. STEEPLES, GIFireE, Bath Fire Brigade

THE City of Bath is renowned throughout the world for the character of its Georgian buildings and crescents and its place in Roman history.

The River Avon as it passes through the city on its way to the Bristol Channel adds further charm to the city, as also does the Kennett and Avon Canal, on which restoration work has commenced on its series of locks.

But these waterways have resulted in tragic loss of life to visitors and residents alike, despite the efforts of the City Council and the Bath Humane Society in providing emergency life saving appliances on the banks.

Improvisation

For years the City Fire Brigade in its ever-widening role of an emergency service has turned out on many occasions with its normal fire appliances to effect rescues, from the waterways, of both people and animals.

Improvisation has been made with ropes, slings and in some cases by the use of small boats which may have been available. On occasions firemen have swam to the rescue.

The waterways are now being increasingly used by students of the new university and also local organisations for river sports and activities, and with vision the City Council decided some two years ago that a river rescue boat would be a valuable addition to the brigade equipment.

The question was then "What sort of boat is most suitable for our use?" Many suggestions were made and rejected, the expert advice of the Royal National Lifesaving Institute was sought and also the knowledge of local people who have had experience of the river.

A visit was made by the Chief Fire Officer and members of the Public Safety Committee to the Boat Show in London, where further expert advice was available. Finally a decision was made on an inflatable rubber boat equipped with a 20 hp outboard motor.

The craft is manned on a voluntary basis by brigade members, of which there is no shortage. Since its debut in March 1969 the boat, at the request of the police or by information from the public, has been launched on 11 occasions to rescue and to search.

A portable short-wave radio is carried with communications to brigade control and also to the land-based fire appliance which make up the attendance to any waterways incident.

The personnel of Bath Fire Brigade are proud of this addition to their fleet, which they feel is one of the very few in use by brigades with inland waterways.

The boat, 13 ft 6 in long and 5 ft 6 in wide, is constructed in "Neophrene" fabricised rubber and weighs 150 lb. It can carry seven people. The power unit is a 200-20 hp Mercury outboard motor of the two-cylinder type with full gear shift. Its remote fuel tank has a capacity of six gallons.

Over-all cost, including ancillary equipment, was £490 in March, 1969.

Dramatic FP in Coventry

COVENTRY Fire Liaison Group is introducing a visual demonstration, complete with sound effects, to drive home the lessons of industrial fire prevention training and "to shake employers and employees out of their apathy", reports CFO A. Leese, Coventry Fire Brigade.

The demonstration, with a mildly humorous theme, will show, during the course of a short play, a general factory workshop in which a number of fires are seen to start. Explosions will help to keep the interest of the audience.

The play will be performed on a portable set at industrial premises for both managerial and executive staff.

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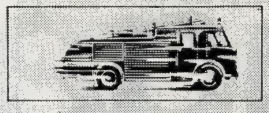

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One of the papers presented at the recent London conference on high-bay warehouses organised by the Fire Protection Association

CASE STUDY OF AN AUTOMATED TYRE STORE

by
P. W. R. GATLIFF,
BSc, CEng, FIEE,
Chief Engineer,
Pirelli Ltd.

IN 1968 we at Pirelli were forced to consider a new warehouse to service our outlets and to release additional space for production at Burton-on-Trent. On the experience of our Italian and German companies, we investigated high and conventional warehouse schemes.

Justification of both initially favoured a high-bay solution but, as we shall see, the cost of fire protection imposed on the high-bay, and the negotiations to achieve it, made this solution marginal in the event.

At this point it is worth stressing that, for all categories of risk, better fire protection is inherently possible with racked storage than with block stacking.

With block stacking it is only possible to install roof protection so a fire can get a firmer hold on stock before actuation of the sprinklers and it is also more difficult to get at the seat of the fire. Tests have shown conclusively that sprinklers alone cannot control fire in a block stacked system and we will return to this point later.

With high category risk goods, such as tyres, block storage is limited to 25 ft and this obviously influences the justification of a higher racking system where intermediary levels are possible and allowed by the rules.

Although the site area was not absolutely critical, that and the specification given to the designers produced a building 348 ft long, 125 ft wide and 87 ft high. There are eight aisles operated by two cranes which in turn are serviced by an input/output transporter at one end. At the other end is a crane transfer and maintenance area.

Storage is initially at 12 levels, storing pallets of six different shapes to suit the various tyre sizes. The pallet variety is divided into large and small modules and the racking is adjustable to maintain the required balance between each.

No man-power

Control is by punch-card from an office outside the warehouse to which a conveyor in a link corridor brings and takes pallets from the production building. As no man-power is employed in the store, apart from maintenance men, it is unheated and only partially lighted. Finally, this is an integral building with the racking itself supporting the cladding and roofing.

At the time we are now talking about (July, 1969) the alternative methods of protection available were: sprinklers, smoke detectors, foam, CO_2 or gas quenching, or a combination of any of these.

Gas quenching appeared to be too expensive; foam too slow and there were doubts whether it was self-supporting to the higher levels.

Smoke detection alone was not acceptable to the insurers. No further discount on premium was allowed for combining smoke detectors with a sprinkler system so we were stuck with sprinklers alone and thus tied to the 29th edition of the FOC rules.

We settled for a wet and dry system and discarded a saving in premium by omitting additional hose reel protection, which anyway is useless in an unattended warehouse.

On receipt of preliminary drawings of the proposed sprinklers system and of the pallet positions within the racking, the insurers stated further requirements in addition to those contained in the 29th edition. These included:

Intermediate levels of sprinklers at 10 ft spacing.

That storage racks should be underdrawn with metal plates at 20 ft levels for the purpose of trapping the flow of hot gases to higher levels.

The intermediate sprinklers at 10 ft levels should be fitted with baffle plates (umbrellas) to avoid non-function due to dousing from above.

It is interesting to note that, at this stage, the insurers denied our belief that the 29th edition did cover high-bay warehouses and that these additional requirements were imposed in the light of reputed experience in continental countries.

It was immediately apparent that these requirements took no note of the storage levels. Further, as has been stated, the warehouse was designed for adjustability of level and, therefore, modifications to these requirements would have to be negotiated with the insurers to allow intermediate sprinkler levels to fit the pallet location.

After discussion they finally agreed to sprinklers at roof level and at six intermediary levels in all racks to suit the storage module (ie, an over-all reduction of one level). And they further agreed to an asbestos-type substitute for the metal sheeting.

From the outset we were unimpressed by the need for the intermediate levels of sheet in the racking to trap the flow of hot gases to higher levels. Our immediate reaction was that this would merely funnel flame up the crane aisles, and to the best of our knowledge these levels had not been fitted in continental warehouses.

We were able to show some film of fire tests carried out in Italy on a simulated high-bay installation which was fitted with sprinkler protection and no sheet levels. The results, in short, showed that:

The fire tended, as expected, to funnel upwards and there was no appreciable sideways spread.

The sprinklers confined the fire to two pallet locations and, although the tests were terminated after 45 minutes, the blaze was not put out, but it did not spread. Given time the fire would have been exhausted for lack of inflammable material.

The fitting of sheeting would have spread the fire sideways and across the aisles.

As a direct result of showing these films, the requirement for the horizontal plate levels was withdrawn, a saving of nearly £20,000, but this meant that the baffles over the sprinklers had to be at each level except the roof.

The insurers' outline requirements were now known (November, 1969) and in the meantime the contract, excluding the fire protection requirements, had been let to ensure completion to our deadline of December, 1970. Obviously, there now started a period of detailed discussion between Pirelli, the insurers, Dexion (the main contractor), and AFA Minerva (the sprinkler sub-contractor).

In January, 1970, when fuller flow details were known, it became apparent that the earlier modifications made under the 28th edition of the FOC sprinkler rules to the factory fire mains to cope with a future high-bay warehouse were inadequate.

This was confirmed by the insurers in February when their final requirements were notified and included for the first time a decision that the flows for both roof and rack protection had to be combined.

Factor of 17

In the Italian fire tests the total delivery from four sprinkler heads was 560 litres per minute (or 120 gpm) and this contained the fire. We were now asked to produce in the warehouse 9,500 lpm (2,000 gpm), a factor of 17 over a proven solution.

It now had to be investigated whether these requirements should be met by uprating existing pump capacities, changing the size of main through the factory, or installing separate reservoirs and pumps to supply the high bay only.

By March it was clear that the least unpalatable alternative was to reduce flow losses by increasing the main size right through the factory and by reducing the spacing of sprinkler heads. Only then could the final design work on the building and sprinkler installation be completed.

It is apparent that these negotiations, caused by a change of rule during the progress of the project, affected the price and prejudiced the completion of the building.

The sprinkler installation was designed to comply with the extra high hazard, category III classification using 15 mm sprinkler heads. There are six sets of control valves feeding approximately 2,700 heads on a wet and dry system.

The installation is fed from the existing water supply system comprising

CONTINUED ON NEXT PAGE

Painter's blow lamp is thought to have caused hotel blaze

Fire-fighters at work at the height of the incident.

THREE special features are mentioned by CFO A. A. Winning, Hampshire Fire Brigade, in his report on a serious fire which broke out in a luxury hotel in the New Forest. There were 40 residents and 24 staff in the hotel at the time.

The three features are:
The excellent conduct of the hotel staff who immediately recognised the danger and organised the safe evacuation of the residents;
The rapid fire spread caused principally by strong winds and a complex roof construction containing many concealed voids;
A co-ordinated and early salvage operation that greatly assisted to minimise the total damage to the premises and contents.

Supposed cause of the fire has been returned as "flames from a painter's blow lamp ignited roof timbers". This is thought to have occurred during external redecoration—painters were working at second-floor level burning off old paint.

One of the painters noticed smoke coming from the roof space at about 1440. Immediate but unsuccessful attempts were made by the workmen to extinguish the fire with buckets of water kept readily available for that purpose.

CFO Winning's report continues that the call to fire control was timed 1450. The predetermined attendance of two water tenders and one water tender ladder was immediately dispatched and the ADO in charge of the Sub-Division ordered on.

On arrival of the first crews, a serious fire involving the roof and attic floor was apparent but a check revealed that all persons had been safely evacuated. An additional two water tenders were requested at 1456 and on receipt of this message the DO and his deputy left for the scene.

Following further requests for assistance the CFO left Winchester and took charge of the incident on arrival.

An initial attack was made on the main fire area in the north-west corner of the roof and attic floor and jets were positioned in an attempt to prevent lateral spread.

Dense smoke and heat on the attic-floor level at this stage made conditions difficult for the branchmen, and concealed roof voids and a strong north-westerly wind were contributing to rapid fire spread. Additional stopping jets were positioned as further crews arrived and BA teams were got to work with jets in the attic-floor corridors.

Water supplies from the hotel's private hydrants and the Blackwater River some 450 ft away proved adequate and a final determined attack pressed home with nine jets enabled the CFO to send back the "Stop" message at 1628.

Ten pumps were used for fire-fighting purposes, including a turntable ladder and pump escape from Southampton Fire Brigade who further assisted by providing a salvage tender.

Severe fire damage was confined to about 4,000 sqft (60 per cent) of the roof and to a total of 18 bedrooms and ancillary rooms on the second and attic floors. Salvage operations carried out concurrently with the fire-fighting attack by both hotel staff and fire service crews largely contributed to minimise water damage on lower floor levels and the great majority of the contents were recovered undamaged.

Total cost of damage from all causes is provisionally estimated at £50,000, concludes the CFO.

PIRELLI AUTOMATED STORE

CONTINUED FROM PREVIOUS PAGE

two diesel and one electrical pump. Water storage is provided by the nearby canal.

The effects of incorporating a fire protection system within racking are pretty obvious, but they are fundamental to the whole building in an integral structure of this nature, particularly if the details are finalised late.

Racks had to be widened to accept 6 in down pipes, so pallets had to be further apart, which affected the steel structure and in turn the width of the building.

Height grows

Where sprinkler levels are required, space over the pallets in excess of normal storage requirements has to be allowed for the discharge to be adequately dispersed over the goods. This is aggravated by the drainage slope in a wet and dry system and so the height of the building grows.

The weight of water and pipes had to be allowed, together with wind, snow and pallet loadings, in the design of the structural steel.

Valves (and access to them), gulleys and manholes were required to drain the system.

Pallet positions are lost through rising mains and valve enclosure, to which access also had to be provided from outside the building. Unusable pallet positions further complicate the control system of the warehouse.

A support for the sprinkler baffles had to be provided, and at different levels, to allow again for the pipe slope.

It can be seen in summary that decisions taken in one aspect (in this case fire protection) can have far-reaching effects in many other areas.

This warehouse is one of many to come in this country. In this instance we have finally arrived at a practical and commercial fire protection solution and it is our hope that through our experience the rules for future projects will be more clearly defined, particularly with regard to the water required.

But, if nothing else, this exercise points to the absolute need for early consultation and agreement between all concerned in a venture of this magnitude.

Finally, I leave you with the thought that the fire protection offered to this warehouse, excluding pumps and fire mains, amounts to 15 per cent of the total cost of the project.

● Fire prevention competition organised by the Forth Valley Industrial Fire Association offered entrants a choice of an essay, poster or project. Prizes were offered in each section and these were presented by Mr. J. S. Hay, vice-president of the association.

* * *

● Leading Fireman B. Bailey, of Ipswich, presented an engraved plaque to Air Vice-Marshal B. Young, Commandant General of the RAF Regiment and Inspector of Defence, when he reviewed the fire service at RAF Wattisham.

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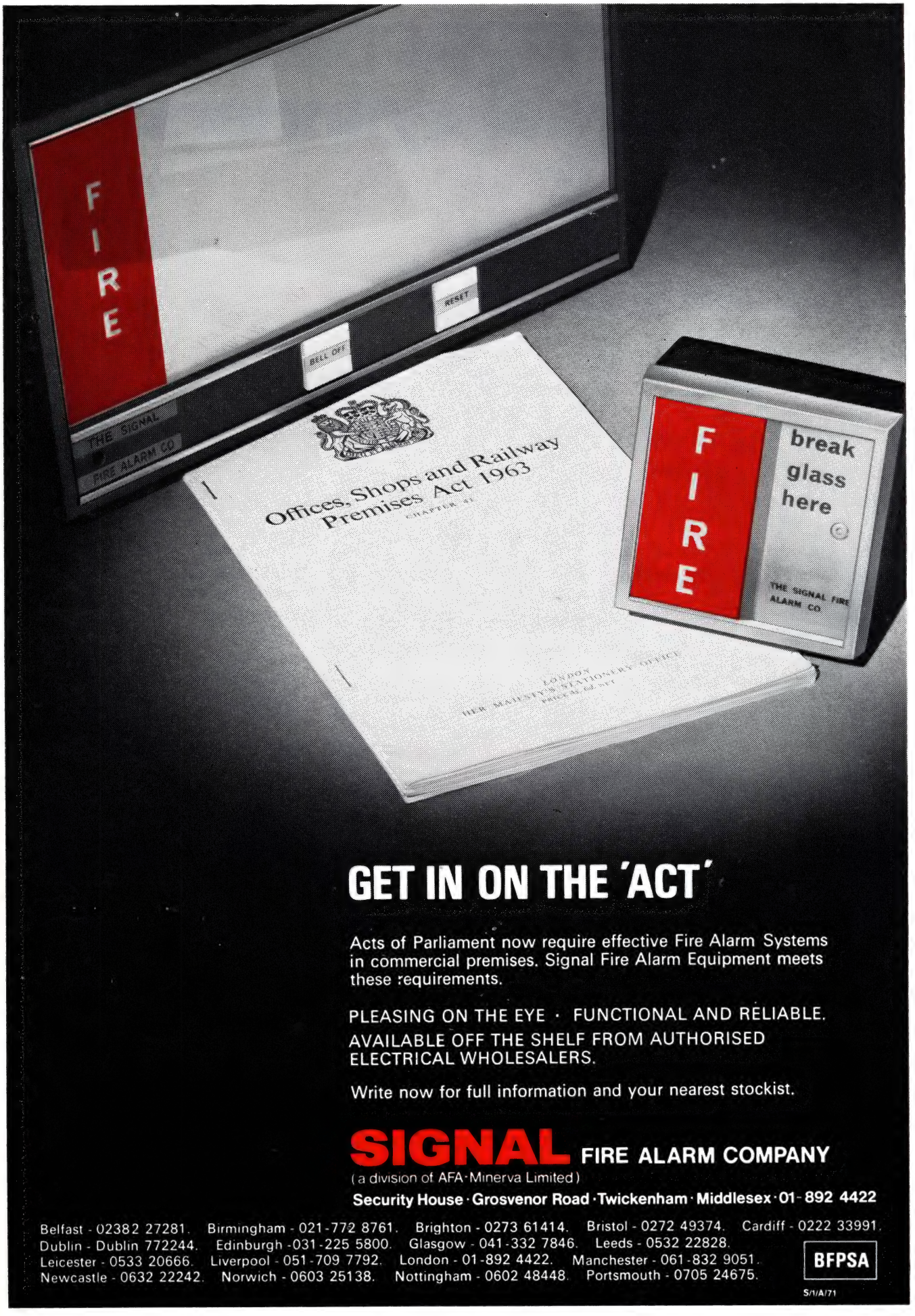
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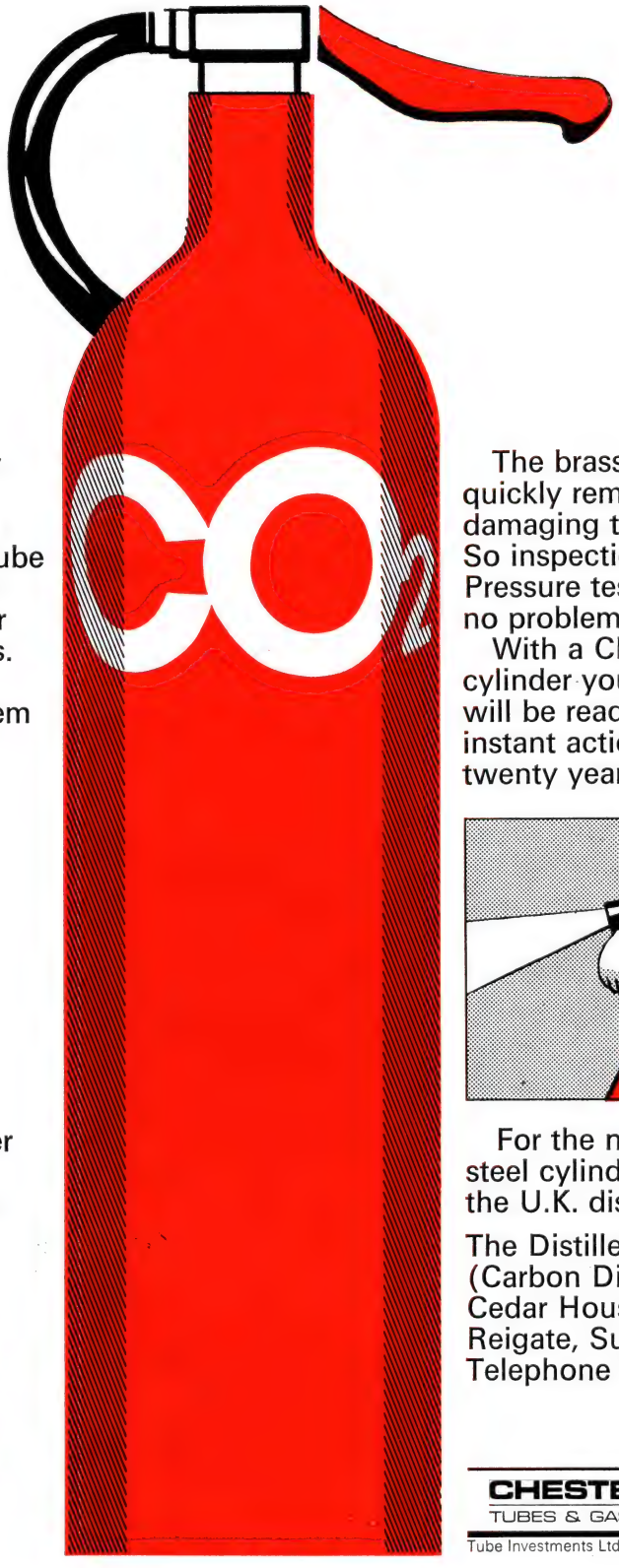
What happens to old CO_2 steel cylinders?



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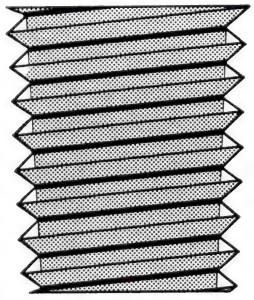

probably good for another twenty.

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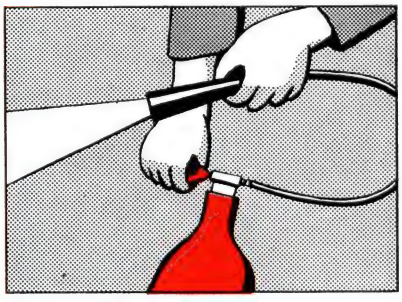

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LETTERS TO THE EDITOR

CONTINUED FROM PAGE 372

The waste of trained men, aged 55

AS in all walks of life, there is a constant inflow and outflow of manpower to and from the service—the outflow being seasoned experienced men trained at considerable expense in fire-fighting and fire safety.

Such men seek employment on retirement in many fields, some prefer to seek new pastures, a number obtain posts in industry—in fire safety or similar appointments. A limited number are employed in Factory Inspectorate appointments.

In perusing the Holroyd Report and the draft Fire Precautions Bill 1970 I find no comment on the colossal waste of manpower—college trained at considerable expense—outflowing from the service at the age of 55 years.

If an ADO in charge of a station is only compulsorily retired at 60 years why is his counterpart at another station so retired at 55 years—both operational—but one is a Station Officer? Indeed if one cannot as an FPO continue to perform this function after 55 years why is a 59-year-old veteran allowed on the fireground?

Why not brigades?

If (as many do) officers on retirement continue to earn their daily bread as fire escape officers and fire officers for various industries and *fire authorities* why is it that the *fire brigades* cannot solve their lack of qualified manpower?

Is it that they consider that to carry out an inspection and prepare a report demands the wearing of uniform?

How many staff of government departments and local authorities carry out various inspections without uniform?

A uniformed operational man out on inspections of various kinds, often at a considerable distance from his station is a "lost rider" as far as efficiency is concerned, so the excuse cannot be that he must "have a liability to engage in fire-fighting duties".

So if you have a problem of "qualified manpower" to carry out your functions of fire safety enforcement, try advertising. You would be surprised how many long-course FP men would be glad of the opportunity to return to the work they have an understanding of—in practice and in theory.

I would. I have had a taste of industrial work, painting 25-year-old extinguishers for £17 10s take-home pay. Can't get anything better—yet. Last year I, as a Station Officer, was considered capable of certification and all the duties of an FPO.

Have I lost this ability so soon?—**Ich Dien** (name and address supplied).

Name please, Rusty

● If "Rusty" will send his name and address as an indication of good faith (but not for publication) we will print his letter concerning retained personnel—and will honour his *nom de plume*.

LONG SERVICE IN SHROPSHIRE

YOUR October issue states that Mr. K. Shutt, Command Fire Officer with the Far East Air Force in Singapore, is believed to be one of the youngest recipients of the Long Service and Good Conduct Medal at the age of 42.

For your information there are five members of the Shropshire Fire Service who can claim to have received the medal prior to reaching the age of 42. Their ages were: 40 years 7 months; 40 years 8 months; 40 years 10 months; 41 years 6 months; and 41 years 11 months.—**A. Bloomfield, MIFireE,** Shropshire Fire Service.

Mr. May is the winner by just 14 days

I HAVE been following the correspondence in your columns (October and December issues) regarding the youngest person to have passed the Associate Membership examination of this Institution.

Perhaps I may be permitted to act as arbitrator concerning the rival claims of Mr. R. Adams and Mr. K. D. May and say that Mr. May is the winner by 24 days. I would not like to say, however, whether or not he is the youngest person to have ever been successful in passing the Associate Membership Examination and shall await with interest any claims in this connection put forward by any of your readers.—**D. S. Ramsey,** General Secretary, Institution of Fire Engineers.

ANGUS AND LANCASHIRE AT NETBALL

Picture by Courtesy of *D. C. Thomson & Co.*

The netball teams of Angus Area and Lancashire Fire Brigades pose for the camera during a visit the Lancashire lassies made to Scotland after they had challenged the Angus team. The visitors lost games, the first by 15-11 and the second by 11-10, but our correspondent reports on the second meeting: "It seemed a great pity that this game had to be won and lost. A draw would have been a fair result. The standard of play and sportsmanship was very high—certainly a credit to the Fire Service."

CHARITY ROAD RUNNERS IN WIGSTON

Picture, courtesy of *Leicester Mercury*

Six members of a watch from the Wigston unit of Leicestershire and Rutland Fire Brigade who ran an unbroken relay over the 96 miles from Skegness to Wigston, to raise money for senior citizens within their station's fire area, in 11 hrs 50 mins. The six runners are, left to right: Firemen Murdock and Mayes, Leading Fireman Draper, Firemen Eames and McNeil, and Sub Officer Meadowcroft.

Safety aspects of diesel engines in flammable areas

by GEORGE NASH, GIFireE,
Chief Fire Officer, Esso Petroleum Ltd.

A NUMBER of fires have occurred in the past and subsequent investigation has shown that the possible cause of ignition was "over-speeding" of a diesel engine. The problem was highlighted when a fatal fire and explosion occurred at a large chemical plant.

The cause of the fire was found to be the diesel engine of a Simon Hoist which "ran-away" when it drew in a mixture of cyclohexane vapour and air. Diesel engines will overspeed to valve bounce or even destruction under these circumstances. In this case the engine speed increased to such an extent that valve bounce occurred, thus producing a flash back through the air cleaner.

The same hazard, of course, may present itself in any oil refinery, chemical works, oil terminal, or ship's engine room.

Esso were quick to recognise the hazard and a research project was immediately instigated. A very simple device, which is relatively inexpensive to make and simple to instal, and which is the subject of a provisional patent application No 27316/70 dated June 5, 1970, has been devised and developed at the Esso Research Centre, Abingdon, in collaboration with Esso Chemical Ltd., Fawley.

It is now in use on operational equipment, both mobile and stationary, at Fawley Refinery.

Studying operations involving diesel engines at Fawley it was decided that we needed to fit some device on both stationary and mobile diesel engines which operated in areas where there was a possibility of a gas or vapour release.

Our approach to truck manufacturers showed that the only system they were able to offer was to fit a driver-operated snap shut butterfly valve in the induction piping. After consideration we rejected this solution for the following reasons:

(a) It would not protect an unattended engine.

(b) If the driver panicked, and in the circumstances envisaged this could happen, it is probable that he would not have the presence of mind to operate the stop valve.

Further investigations of the market showed that the type of automatic device that we considered essential for our requirements was not available. Because of this, we studied the problem with a view of developing our own protective device.

Study of the variables associated with engine speed revealed that the most likely source of energy for operating an automatic device was the air induced into the engine. Working from this basis, we have developed the protective device described as follows and generally as shown in the illustration.

The device

The device comprises a spring-loaded poppet valve fitted upstream on the air inlet manifold which can be critically adjusted such that it will permit an engine to run at its normal maximum governed speed. As soon as that speed is exceeded the valve will snap shut, against the spring pressure, and will remain so until the engine stops.

If desired a locking device can be fitted which will prevent the engine from being restarted until it is manually reset. The device shown on the drawing is not fitted with a locking device and once the engine is fully stopped it will return to the normal position, thus permitting the engine to be restarted.

A further feature of this valve is that it is free to close in the opposite direction without resistance, thus providing a safeguard against the engine running backwards.

The valve is operated by the pressure differential across the valve seat. As the amount of injected air (or vapour) increases the pressure differential increases until the predetermined engine speed is reached, at this speed the pressure differential becomes greater than the force exerted by the spring and the valve slams shut. The closing action is instant and complete.

It is estimated that the cost of producing a unit for a small engine will not exceed £5, and for the biggest engines will not be greater than £30. We believe that this device meets our full requirements for diesel engine overspeed protection in that it has the following attributes:

(a) Is simple—thus cheap and easy to install.

(b) Is fully automatic.

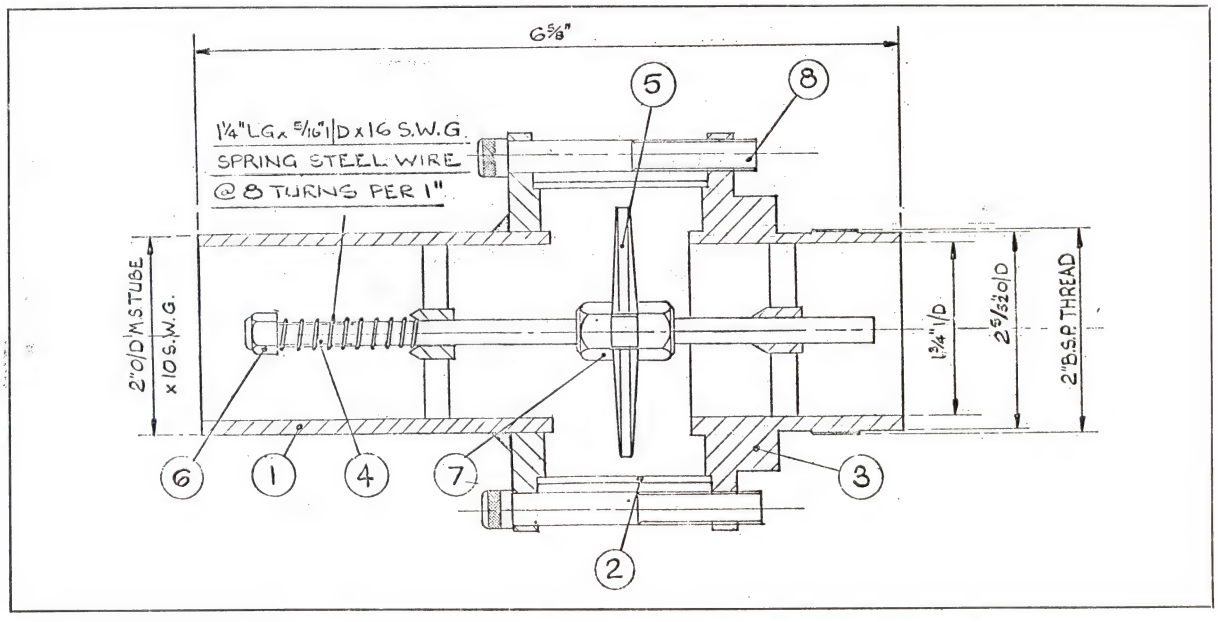
(c) Should require little or no maintenance.

(d) Foolproof—the installation is such that it would be extremely difficult to interfere with.

We have successfully carried out road tests on a truck and find it will operate at all throttle conditions but still retain its overspeed control capability. We have also simulated the conditions of a vapour release by deliberately inducing butane into the induction manifold. On each occasion the engine was instantly stopped when the preset speed was reached.

In addition to being excited by ingesting flammable vapours, diesel engines can be caused to run away for the following reasons:

1. Failure of the inherent engine governor, ie, such as a broken linkage.
2. By the engine overheating or over-



The safety device developed by Esso for use on diesel engines in flammable areas.

LONG BATTLE TO STOP FIRE SPREAD FROM STORE

DAMAGE in the region of £500,000 is estimated to have been caused in the fire which broke out at Johnson Bros. departmental store in Western Road, the main shopping street in Brighton.

CFO E. S. Calvert, Brighton Fire Brigade, reports that 85 fire-fighters, including crews from East Sussex and West Sussex brigades, had a hard task to prevent the fire spreading to the stores on either side of the affected building.

But they were successful and both companies involved, as well as the directors of Johnson Bros., had sent letters to CFO Calvert expressing admiration for the work of the fire-fighters.

Fourteen appliances, plus a forward control unit, were in attendance and 15 large water jets were used.

The call, continues the CFO, was at 0250 when a patrolling policeman saw flames at the rear of the premises. There were 25 repeat calls.

The first attendance of pump escape, pump and turntable ladder responded, the senior "Send" officer going on from residence. On arrival it appeared that a fire was burning at the rear of the premises with access from Marlborough Street, and pumps were made up to three.

A stack of timber racks placed on top of a loading ramp adjoining a set of rear timber loading doors was well alight, and the officer-in-charge at first sight got to work on this fire.

He almost immediately noticed that extensive smoke was issuing from the vents and louvres in the building and fire was visible centrally inside the building. Pumps were made up to six at 0300.

Entry was forced through a rear door close to a loading ramp, the operation proving difficult owing to the efficient security of the premises.

Inside, it was found that a serious fire was burning in the area of the lifts and clearly it had gained a very firm hold and extended to the upper floors.

A deep space between the fire area and rear doors clearly confirmed that the fire originated inside the premises. This was later confirmed on investigations by brigade officers.

Hose lines were got to work from Marlborough Street and an escape pitched to the first floor rear with jets operated into that floor. It was then clear that all floors were involved in the fire to a serious extent.

The CFO arrived at 0312 and took control of the fire, making pumps to eight at 0325. He was assisted by the DCFO and other senior officers.

On arrival the CFO found a serious fire on all floors which had clearly been burning for a number of hours, evidenced by the thick smoke of a colour showing combustive gases and danger of imminent flash-over.

Water jets were brought into use from Western Road and Marlborough Street and a TL operated from Western Road to help cover fire spread to the adjoining premises of Woolworths Stores. Pumps were increased to 10 with two TLs.

Flash-over

The fire ventilated from the roof some 25 minutes after arrival, which released some of the terrific heat and pressure from the building which had prevented the crews from gaining close access into the premises, despite wearing breathing apparatus, and at the same time the flash-over occurred and the complete premises were enveloped in flames.

So intense was the heat that an escape and an appliance narrowly escaped destruction had they not been moved by fire-fighters under dangerous conditions and intense heat. Even so, some damage to paintwork on appliances occurred.

It was clear that a hard battle was to take place if extensive fire spread was to be avoided. The party wall with Woolworths was very hot and cracking rapidly. Plate glass windows on the south side of Western Road were cracking from heat, as were windows of C & A Store on the Marlborough Street side.

The danger of radiated heat igniting the light combustible materials in the windows of all these stores was very real. Concentration by water curtains in Marlborough Street and on the roof of Woolworths was operated to prevent fire spread. Both TLs were invaluable in this effort.

Conditions for fire-fighters on the TLs were punishing from the heat and smoke, as they were for all branchmen.

All key holders of affected properties were called in and they all stood by at the control unit in readiness to open up their premises if required. The police also assisted by evacuation of cottages in Marlborough Street against possible rear spread.

Personal danger

An additional hazard was the enclosed overhead walk or tunnel leading from the rear of the third floor of Johnsons to their extensive warehouse in Regent Hill. Jets were introduced into the tunnel and the threat of fire spread at this point was averted.

The battle to prevent fire spread went on for about 2½ hours with all personnel working magnificently, often in circumstances of some personal danger. Special supervision was necessary to ensure safety from falling debris.

With pump make-up messages, automatically two ambulances attended and stood by at the control unit, and were very helpful in assisting with distribution of refreshments sent on from brigade HQ.

With a hard-pressed attack of water jets, the danger of fire spread receded, although five separate fires were attended by the stand-by pump at the fire, each of combustible rubbish, ignited by flying brands from the fire.

By 0600 the threat of fire spreading had been averted and all threatened premises were then inspected with the key holders present and found to be safe. Efforts were then concentrated on the main fire.

Two further hazards developed. First a danger of collapse of the upper walls of the building, which showed signs of severe distortion and cracks.

The second was the extinguishing of the burning fuel oil leaking in the basement from the central heating supply pipes distorted by the heat of the fire. This necessitated using some 200 galls of foam compound, and attacking the fire from pavement lights on the Marlborough Street side. This was dealt with by about 1000.

Loss figures for October

OCTOBER'S provisional fire loss figures, at £10·2 million, are the highest ever recorded for that month and bring the total for the 12 months ending October to £120 million. The comparable total for 1968/69 was £111·8 million.

During October, according to BIA figures, there were seven large fires each estimated to have cost £250,000 or more. Of these the largest, estimated at £1 million, was at a Welsh oil refinery.

In all, there were 89 fires estimated at over £10,000 each, and 15 of these cost £100,000 or more.

There were 21 large fires in shops, hotels, schools and other places open to the public.

Safety aspects of diesel engines

turning when the sump oil will become the fuel.

3. When the air cleaner bath is overfilled.

The device we have developed will provide protection against all of these conditions.

With respect to our own plans at Fawley, it is our intention to protect all diesel engines operating within hazardous areas in the near future. This requirement is likely to cover long-term contractors as well as Esso-owned machines. The Esso Petroleum Marine Department is also considering fitting the device to its ships' engines.

For information, other systems of protection were considered. Briefly these were:

(a) Blanketting with inert gas. This is an effective way of stopping an engine, and has received wide acclaim. The main drawback is, however, that it is difficult to automate. Such a system would be costly to develop and expensive to produce, since sensing devices such as explosimeters or vibration detectors would be needed as triggering devices. The equipment would be delicate and a high degree of maintenance would be essential.

(b) A butterfly valve fitted in the induction piping operated by a trip from the inherent engine governor or by an externally mounted additional governor. After considerable research this approach was rejected, because of the wide variety of engines requiring different expensive modifications.

Should any readers wish to make use of the device described in this article it is suggested that they write to Mr. K. J. Veryard, Esso Engineering Services Ltd., Patents and Licences (Europe), 15-17 Suffolk Street, London, SW1.

Nu-Swift extinguishers are ready for the change to metrication

NU-SWIFT International Ltd. have designated their new, stored-pressure, multi-purpose dry powder extinguisher, Model 1826, 12 kilogrammes, which in British terms is near enough to 26 lb.

This means not only that the weight can remain unchanged when Britain goes metric, but equally important, the extinguisher in its present size is readily acceptable in countries which already deal in metric terms.

Model 1826 is the second extinguisher to be launched in the revolutionary Nu-Swift range of extinguishers claimed to be suitable for *all* fire risks except live electrical equipment above 1,000 volts, unusual inflammable metals such as magnesium and uranium and carbon disulphide.

It is also highly efficient, say Nu-Swift, on mixed risks, including those complicated by the presence of live electrical equipment or wiring of normal voltages; as it is a rare fire which is confined to one kind of material only, this is a major advantage.

The extinguisher is 67 cm (26½ in) high, has an over-all weight of 20·9 kg (46 lb), and contains a minimum of 12 kg (26·4 lb) of "Multi-A" dry powder. "Multi-A" powder consists essentially of a mixture of ammonium salts, to which other ingredients have been added to ensure long-term maintenance of its fire-fighting effect and free-flowing properties.

One of the new, 12 kg extinguishers, claim the manufacturers, can extinguish fires in carbonaceous substances such as wood, textile-fabrics and paper (Class A fires) of a size equal to that requiring four 10-litre (2·2-gallon) water-type extinguishers, provided flowing of or soaking by the extinguishing agent is not necessary. It also provides a heat-shield for the fire-fighter.

It is the equal of a conventional dry powder extinguisher (ie, one which is not fully efficient on large Class A fires) of similar size on fires of inflammable liquids, and is ideal for use against severe fires involving inflammable gases.

The powder cloud has a range of 7·5 metres (25 ft), and the duration of the discharge, if uninterrupted by squeezing the hand lever on the nozzle, is 28 seconds at the rate of approximately 450 grammes (1 lb) per second.

Model 1826 is approved by the Fire Offices' Committee, Reg No 104/25.

MR. DOULTON RETIRES

MR. P. D. Doulton, chairman and joint managing director of Matthew Hall & Co. Ltd., has retired after 30 years on the board of the company. Sir Robert Speir, a director for the past 10 years, has been appointed chairman and Mr. A. L. Pearson, joint managing director, is now managing director.

Minimax 'new look' includes diagrammatic instructions

A COMPLETELY restyled "new look" in fire extinguishers has been introduced by Minimax Limited, one of Britain's oldest fire equipment manufacturers, who have eliminated the knobs and strikers which have been common to fire extinguishers for so long.

A radical departure from those which had to be thumped hard on top, and the clumsy turn-over type, these new extinguishers need only the press of a handle, the squeeze of a trigger, or touch of a button to start them working. Tests have shown that women and young people can operate them instantly and easily, claim Minimax.

Another feature is the "visual aid" instruction which dominates the label. They are in the form of two diagrams which can be understood by non-English speakers from a distance of three yards.

Minimax have adopted the new BS recommendation on colour coding, which specifies red for water-type extinguisher, blue for powder, cream for foam, black for carbon-dioxide and green for vaporising liquid.

The red and cream extinguishers have press-down handles, the blue has a trigger action and the black one a press-button. In all cases there is complete control over the discharge.

A further label at the back of the extinguisher gives technical details.

The latest addition to this range of foolproof lever-operated extinguishers is the 10-pint Minimax TP. Small, compact and easy to carry, it can be operated instantly by young and old. It is stated to be the ideal water-type extinguisher for the home as well as for larger establishments like hospitals and schools.

An addition to the Minimax extinguisher range is the 10 pint (6·25 litre) Minimax TP shown here.

Buyers' Guide

'Aqualite' fault removed

IMPROVED "Aqualite" plastic instantaneous couplings are now being introduced by the Angus Fire Armour Division of George Angus & Co. Ltd. —after a full programme of testing, modification and development which followed the failure of one of their Aqualite couplings under high pressure about two years ago. The new version has a reinforcing boss and much wider lug to prevent any repetition of the failure.

These improved Aqualite couplings, for which a patent has been applied, are chemical and corrosion retardant, have a high resistance to UV degradation, are light in weight and have very high tensile and impact strength. They are self-lubricating, will always mate easily whether of gunmetal, alloy or plastic and will not freeze.

This introduction comes at the end of a long programme of study and research by Angus which led to the selection of an acetal resin with the required tensile strength, stiffness, and fatigue endurance.

Prototype mouldings were made of this substance and the first models had an all-plastic male half. To overcome damage inflicted on the lip by the metal lugs in the female half, a gunmetal reinforcement ring was added. This ring introduced stress distribution problems and a full gunmetal lip was screwed and shrunk into the coupling before final adoption.

Extensive tests were made and the couplings were issued, but in spite of all Angus's safeguards a failure occurred on one coupling, and examination revealed that this was due to only one lug being engaged.

Double width

Laboratory tests showed that this type of failure would be rare, but might happen, although only at high pressures.

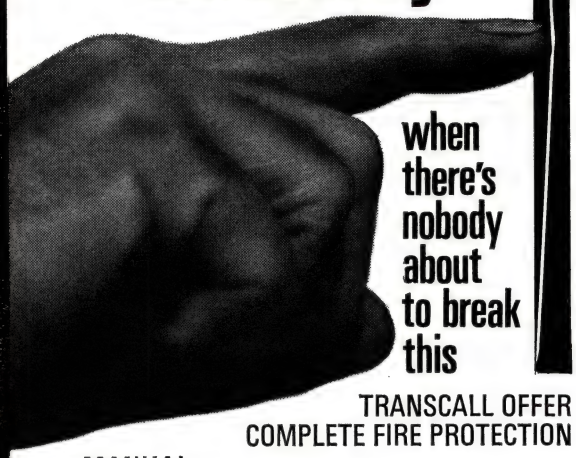
Although a warning could have been issued with new couplings and to existing users, Angus decided to withdraw the couplings until the fault could be overcome.

Further development work resulted in the improved coupling which will not fail in this way, even if only one lug is engaged.

The basic differences are that the gunmetal lugs in the female half of the coupling have been more than doubled in width and a substantial reinforcing boss has been added to obtain better stress distribution in the lug areas.

TRANSCALL

Smoke & Heat detectors raise the Alarm —automatically



when there's nobody about to break this

TRANSCALL OFFER COMPLETE FIRE PROTECTION

MANUAL—
finger pressure is all that's needed to break the contact.

AUTOMATIC—
Remember 60% of all high loss fires start at night. Transcall's smoke and heat detectors raise the alarm —even when nobody's about. The attention grabbing two-tone electronic alarm is sounded automatically.

TRANSCALL Fire Protection Systems are :-

- Solid state—with built-in automatic fault monitoring.
- Flexible—we can adapt to suit **your** particular requirements.
- Competitive—a closed circuit system—at open circuit prices.

TRANSCALL also manufacture :
Hotel—Hospital Radio ; Call systems; Pocket Paging.
Find out more by completing the coupon below.

TRANSCALL Cape Hill, Smethwick, Warley, Worcestershire. 021-558 2471-3

Please send me details of **TRANSCALL FIRE PROTECTION SYSTEMS** ☐
Let me know about line monitoring too ☐
Ask your representative to call ☐
NAME .....
COMPANY .....
ADDRESS .....
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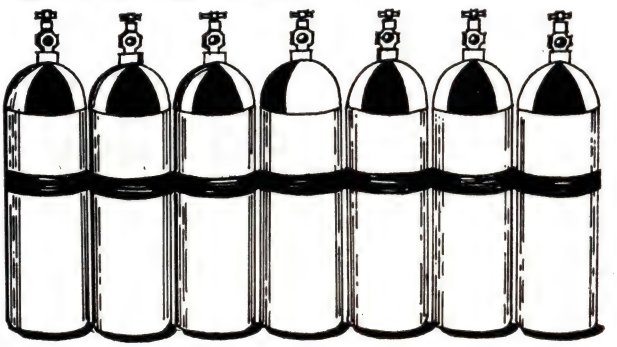
Top quality air FAST

New W&J 175 Compressor charges standard 2,250 litre bottle in under 3 minutes!



The new W & J 175 compressor is to-day's finest value and one of the biggest standard breathing air compressors now available. This high pressure compressor plant delivers 30 cfm of air at pressures up to 3,800 psi . . . enabling it to fill a standard 2,250 litre bottle from atmospheric to 3,000 psi pressure in under three minutes. Up to eight bottles can be filled at a time. It's top quality air too — safe to breathe, clean air — pressure maintaining valve, piston ring packs and filters eliminate moisture and oil.

Supplied as a packaged unit
The W & J 175 is a compact, 90° Vee four cylinder three stage machine. Precisely balanced components give smooth, quiet running. Integral water-cooled coolers and moisture traps simplify installation. Gauge board shows all information at a glance — makes plant control easy. Fully complies with Home Office and BS requirements.

Smaller capacity Trident also available
Compact and lightweight, the W & J TRIDENT delivers air at 10 cfm at pressures up to 3,250 psi.

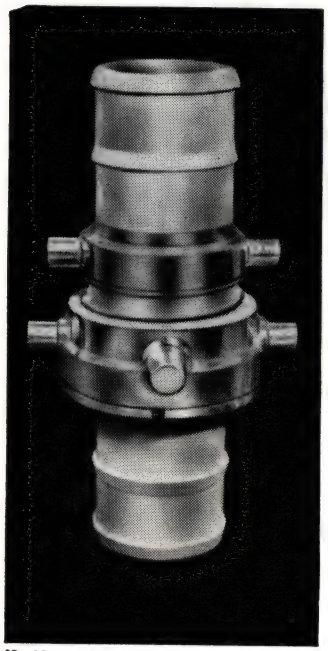
For full details please write or telephone Gloucester (STD 0452) 28431 asking for "Sales Engineers".

W&J **WILLIAMS & JAMES (Engineers) LTD.**
Chequers Bridge, Gloucester. Telex: 43233

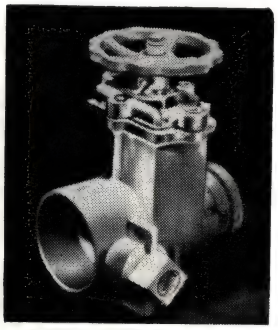
FRANK QUALITY FIRE FIGHTING EQUIPMENT

HIGH STRENGTH ALUMINIUM ALLOY

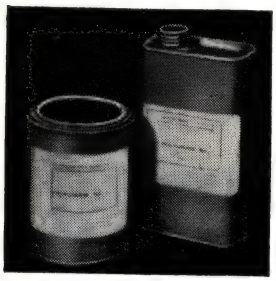
Illustrated are a few examples from our extensive range of Fire Brigade fittings all of which can be supplied to various specifications and sizes, manufactured from high tensile aluminium alloy and gunmetal.



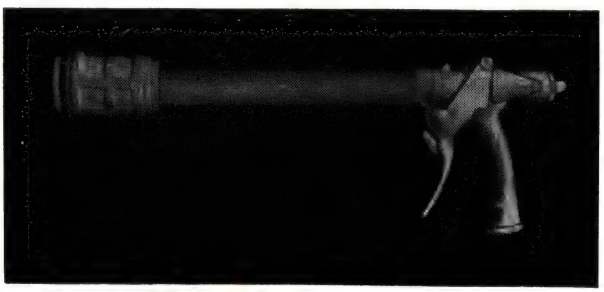
62. 3", 4" OR 5½" SUCTION COUPLING ROUND THREAD DOUBLE SERRATED OR MULTI-SERRATED



94. FULL BORE GATE VALVE



98. MOLYBDENUM DISULPHIDE LUBRICANTS



101. HIGH PRESSURE FOG GUN

Price list & illustrated brochure on request

*Numbers refer to items in catalogue

Established 1881

WALTER FRANK & SONS LTD
WAKEFIELD ROAD · BARNSLEY · YORKSHIRE
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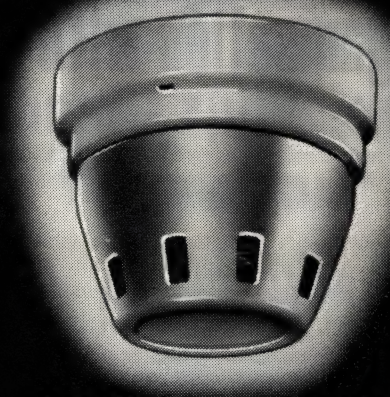
IONISATION SMOKE DETECTOR

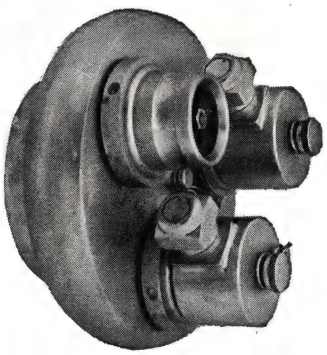


A complete range of sensing equipment is available to provide effective warning of fire for all types of premises.

Send for full details:-

PHOTAIN CONTROLS LTD.

RANDALLS RD. LEATHERHEAD SURREY
Tel: 01-537 2776/5517



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STANDPIPES
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- SWIVEL AND DETACHED HEADS

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ALL EQUIPMENT IN LIGHT ALLOY AND BRONZE MANUFACTURED AND SUPPLIED BY

GALENA WORKS

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STUDLAND STREET, LONDON, W.6
ESTABLISHED 1919 Telephone: 01-748 6154

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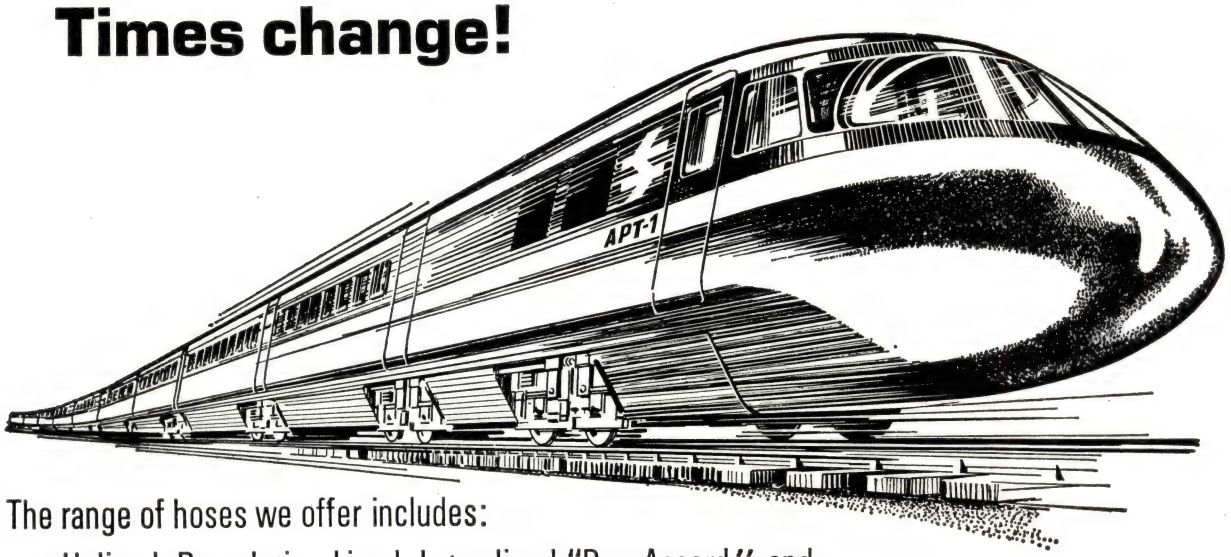
Fire Hoses Not so long ago we produced nothing but unlined canvas hose, but now, thanks to research, we can offer the widest range of the finest hoses money can buy.

Times change!



The range of hoses we offer includes:
Unlined, Percolating Lined, Latex-lined "Bon-Accord", and Polyurethane coated CT350 and CT500, using man-made fibres. And *still* we research!

Safety & Utility We start with the basics – like spinning *yarn* that makes carpets look and feel better. And our furnishing fabric yarns take colour better and are more resistant to fire. We also make *Superduck*. This fine, linen-woven material has a smooth, even, close construction and is given a balanced waterproofing treatment. It makes a superb road transport tarpaulin. These are all first class products. And *still* we research! We progress through modern chemistry towards the technological expertise of tomorrow – and we're proud of it!

Richards Limited
P.O. Box 71 Aberdeen AB9 8DT
Telephone: Aberdeen 53623 Telex: 73101

APPOINTMENTS

COUNTY BOROUGH OF WALSALL
APPOINTMENT OF CHIEF FIRE OFFICER

APPLICATIONS are invited from suitably qualified experienced Officers for the appointment of Chief Fire Officer of the Walsall Fire Brigade which will become vacant on 28th February, 1971.

The salary payable will be in accordance with Grade (3)—£2,883 x £114 (4)—£3,339 per annum.

Residential accommodation is not provided but a rent allowance will be paid in lieu, together with fuel and light allowance of £70 per annum and an approved allowance for the use by the Chief Fire Officer of his own car on official duties.

The successful candidate will be required to pass a medical examination and the appointment will be subject to the Scheme of Conditions of Service of the National Joint Council for Chief Officers of Local Authorities' Fire Brigades, and any appropriate Regulations or Orders made by the Secretary of State, and will be terminable by three months' notice on either side. Applications, which must reach the undersigned by 4th January, 1971, must include the following particulars:

(1) Full name, address, date of birth, and marital status;
(2) Present appointment and rank;
(3) Previous appointments (with ranks) and dates of appointment;
(4) Educational, technical and specialist qualifications (Note: Associate Membership of the I.F.E. will be regarded as an additional qualification);
(5) Details of courses attended within the last five years;
(6) Technical, administrative, and operational fire experience;
(7) Names and addresses of two persons to whom reference may be made (in addition to the Candidate's present Chief Officer).

Canvassing will disqualify and candidates must disclose in writing whether to their knowledge they are related to any member or Officer of the Walsall County Borough Council.

J. A. GALLOWAY,
Town Clerk.

The Council House
WALSALL.

REPRESENTATIVE required with wide knowledge of "Foam" to market complete new range of Foam-making equipment. Write giving full details of experience and salary required to Box No. F.5191, "Fire", 34/36 Dudley Road, Tunbridge Wells, Kent.

COUNTY BOROUGH OF HARTLEPOOL

APPOINTMENT OF CHIEF FIRE OFFICER

APPLICATIONS are invited from suitably qualified and experienced Officers for appointment to the post of Chief Fire Officer which will become vacant on 1st June, 1971.

The appointment which will be subject to the Fire Service Regulations, the Scheme of Conditions of Service of the National Joint Council for Chief Officers of Local Authorities Fire Brigades and a satisfactory medical examination will be terminable upon three months written notice on either side.

The salary to be paid will be in accordance with the National Joint Council scales i.e. £2,478 (4 × £108) £2,910.

The Officer appointed will be required to provide his own accommodation within the County Borough for which an appropriate rent allowance will be paid together with a fuel and light allowance of £95 a year. He will be required to provide his own car for official duties for which a car allowance of £165 a year is paid.

Applications giving the names and addresses of two referees must be received by the Town Clerk, Municipal Buildings, Hartlepool by 22nd January, 1971 and include the following information:

1. Full name, address, date of birth and marital status.
2. Present appointment, rank and salary.
3. Previous appointments with ranks and dates of appointment.
4. Educational, professional, technical and specialist qualifications.
5. Technical, administrative and practical experience.
6. Fire Service Courses attended.

Canvassing in any form will result in disqualificaiton.

TENDERS

STAFFORDSHIRE FIRE BRIGADE
UNIFORM TENDERS

TENDERS are invited for the supply of Uniform during the year commencing 1st April, 1971.

Forms of specification and details of items required can be obtained on application to the County Fire Officer, Staffordshire Fire Brigade Headquarters, Pirehill House Aston, Stone, Staffs. ST15 0BS.

Completed tenders must reach the undersigned by first post of 20th January, 1971.

T. H. EVANS.

County Buildings,
Martin Street,
Stafford.

COUNTY BOROUGH OF SOUTH SHIELDS
FIRE BRIGADE DEPARTMENT
UNIFORM CLOTHING

TENDERS are invited for the supply of FIRE BRIGADE UNIFORM CLOTHING. Details of requirements and Tender Forms may be obtained from the Chief Fire Officer, Fire Brigade Headquarters, Waterloo Vale, South Shields.

No Tender will be considered unless sent in a plain sealed envelope addressed to the Chief Fire Officer bearing the words "Tender for Fire Brigade Uniform Clothing", but devoid of any name or mark to indicate the sender, and delivered not later than 12th March, 1971.

The lowest, or any, Tender will not necessarily be accepted.

Any samples must be addressed to the Chief Fire Officer.

R. S. YOUNG,
Town Clerk.

NORTHERN FIRE AREA JOINT COMMITTEE
TENDERS FOR CLOTHING

TENDERS are invited for the supply of Fire Service Clothing for the year commencing 16th May, 1971, all in accordance with current Home Office specifications.

Firms tendering must be prepared to complete the order by 31st July, 1971.

Forms of tender may be obtained on application to the Firemaster, Fire Brigade Headquarters, Harbour Road, Inverness.

Tenders, in sealed envelopes endorsed "Tenders—Fire Brigade Uniform", should reach the undersigned by 1st February, 1971.

JOHN R. HILL,
Clerk.

Town House,
INVERNESS.
9th December, 1970.

WORCESTER CITY AND COUNTY FIRE BRIGADE
UNIFORMS

Tenders are invited for the supply of:

D.B. Reefers and Trousers.	Socks, Mens.
Fire Tunics.	Shirts and Ties.
Dungaree Suits, 2 piece.	Rubber Boots.
Caps.	Overtrousers.
Shoes.	Raincoats.
Uniform, Firewomens.	Helmets.
	Car Coats, Blue.

for the period 1st April, 1971 to March 31st, 1972.

Details of specifications and quantities can be obtained by application to the Chief Fire Officer, Copenhagen Street, Worcester, WR1 2HQ.

Tenders should be addressed in plain sealed envelopes, endorsed 'Tender Uniform' so as to reach the undersigned not later than 11th January, 1971.

W. R. Scurfield,
Clerk to the Worcester City and County Fire Brigade Committee,
Shirehall,
Worcester.

Tenders not complying with the above, cannot be considered.

ROCHDALE COUNTY BOROUGH FIRE BRIGADE

TENDERS are invited for the supply of one type 'B' Water Tender. Specification may be obtained from the Chief Fire Officer, Rochdale County Borough Fire Brigade Headquarters, Maclure Road, Rochdale.

Tenders to be returned to the Town Clerk, Town Hall, Rochdale, by Thursday the 21st January, 1971.

TENDERS continued

ROTHERHAM COUNTY BOROUGH FIRE BRIGADE
AND AMBULANCE SERVICE

TENDERS are invited for the following items of uniform:
Undress uniform, fire tunics, socks, shoes, shirts, macs, waterproof trousers, ties, overalls, and woollen pullovers.
Further particulars of quantity, etc., can be obtained from the Chief Fire Officer, Erskine Road, Rotherham.
Tenders, with samples enclosed, bearing no indication of sender and endorsed "Fire Brigade Uniform" should be sent to reach the Chief Executive Officer and Town Clerk, Municipal Offices, Rotherham, not later than 22nd February 1971.

DURHAM COUNTY FIRE BRIGADE

TENDERS are invited for the supply of the following appliances for the year commencing 1st April, 1971.
6 Water Tenders, Type B.
Tender forms and specifications are obtainable from the Chief Fire Officer, Framwellgate Moor, Durham.
Tenders should be forwarded in plain sealed envelopes endorsed "Tender for Appliances" to reach the undersigned not later than 30th January, 1971.

J. T. BROCKBANK,
Clerk to the County Council.

County Hall,
Durham.

CITY OF LINCOLN FIRE BRIGADE

TENDERS are invited for the supply of one Water Tender Type "B".
Details of the specification can be obtained from the Chief Fire Officer, Fire Brigade Headquarters, South Park Avenue, Lincoln.
Tenders in sealed envelopes marked "Tender for Fire Appliance" should reach The Chief Executive Officer, Corporation Offices, Lincoln, not later than February 15th, 1971.

BEDFORDSHIRE FIRE SERVICE

TENDERS are invited for the supply of three type "B" Diesel Engined Water Tenders mounted on Ford D600 chassis.
Specification and form of tender from: The Chief Fire Officer, Fire Service Headquarters, Southfields Road, Kempston, Bedford.
Tenders to: The Clerk of the County Council, County Hall, Bedford, by Monday 15 February 1971.

HOLIDAYS

PERRANPORTH, Cornwall, Seabreeze Holiday Caravans. Under our personal supervision. Beautifully situated. SAE Olliff, Liskey Camp.

TORVIEW CARAVAN PARK, Goodrington, Paignton, Devon. Excellent choice of caravans; Club, Dancing, Kiddies' room and playground. Write for prices, brochure and Fire Service discounts.

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B. A. GUIDE LINE
DESIGNATING TALLIES
IN ACCORDANCE WITH H.O. CIRCULAR 46/1969
PRECISION UNITS (Dorset) LTD.
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PASS YOUR FIRE EXAMS
Experienced coaching for I.F.E. and Home Office Examinations. . . . . Write for free prospectus to
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FOR SALE

SHROPSHIRE FIRE SERVICE

FOR SALE

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BIRMINGHAM Fire and Ambulance Service invite offers for two Bedford S.B. Fire Appliances (400-gallon tank) fitted with Dennis No. 2 Pump (manual primer) and Winn 30 g.p.m. hose reel pump. Apply to the Chief Engineer, Birmingham Fire and Ambulance Service Workshops, Highgate Road, Birmingham 12 (772 5192) for arrangements to view. Offers marked "Tender for purchase of Surplus Fire Appliances—Fire Brigade Committee" to be delivered to the Town Clerk, The Council House, Birmingham 1, not later than 22nd January 1971.

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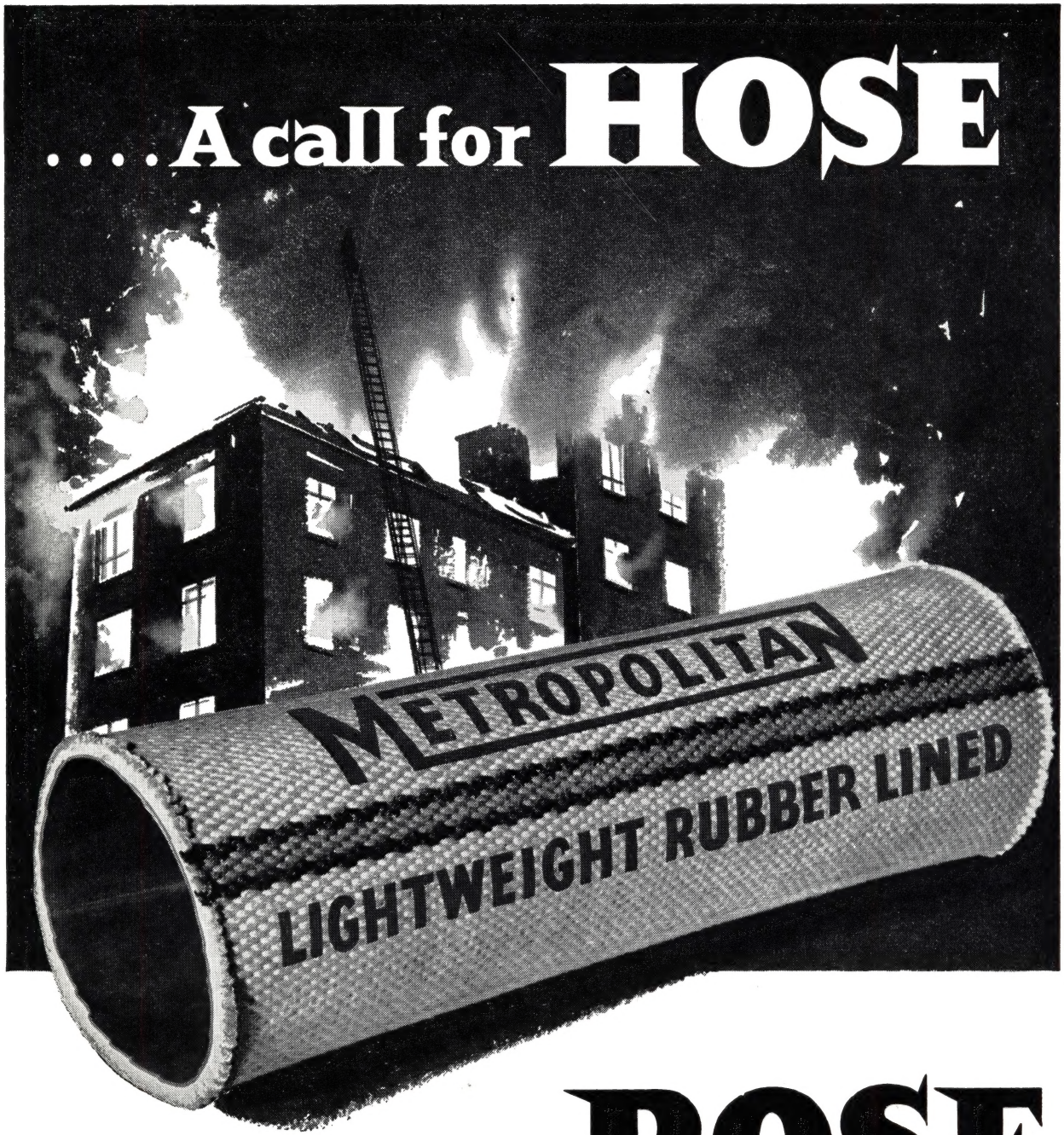

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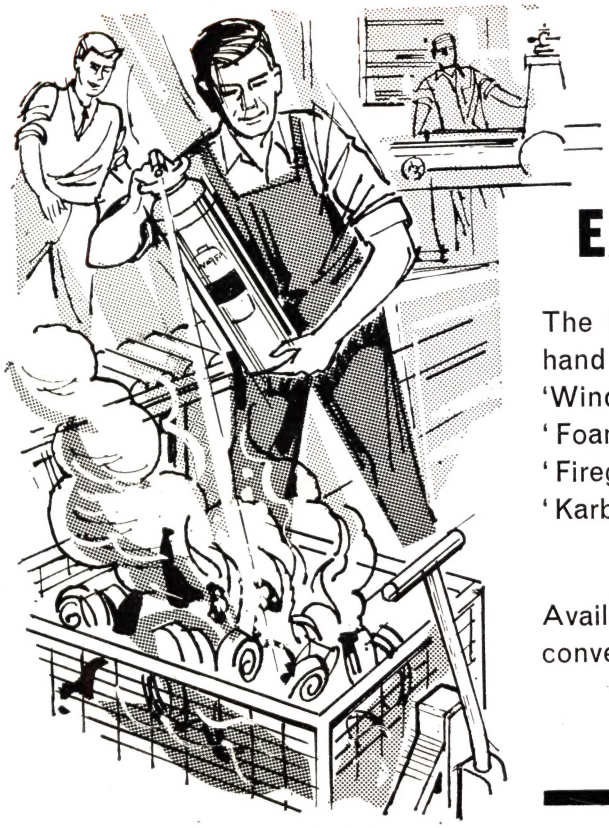

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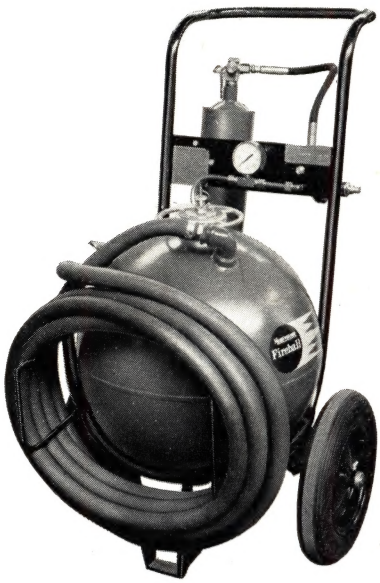

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